

TABLE OF CONTENTS

MONTANA STATE LIBRARY
1515 East Ch. Avenue
Cap. No. 201-400
Helena, MT 59620-1800

Lewis & Clark County

Helena	Joslyn Street Tailings	25-501
Marysville	Drumlummon Mine/Mill/Tailings	25-024
Rimini	Peerless Jenny/King	25-006
	Woodrow Wilson	25-258
	Peter	25-259
	Queensbury	25-262
	Monte Cristo	25-275
	National Extension	25-287
	Monitor Creek Tailings	25-503
	Bear Gulch	25-504
Stemple	Jay Gould Mine/Millsite	25-500
	New Jay Gould Millsite	25-502

Madison County

Pony	Garnet Gold Mine	29-035
	Chicago Mining Corp. Pony Mill	29-500
Virginia City	U.S. Grant	29-095
	Belle	29-098
	Prospect	29-136

Mineral County

St. Regis	Gold Chrome	31-037
-----------	-------------	--------

Missoula County

Clinton	Wallace Creek Millsite	32-019
Copper Cliff	Copper Cliff	32-001
	Frogs Diner	32-027

Park County

New World	Great Republic Smelter	34-000
-----------	------------------------	--------

HELENA

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: JOSLYN STREET TAILINGS PA#: 25-501

Date: July 27, 1994 Time: 0830-1800

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Clark, West; Pioneer

Visitors: Earl McCurley, MDSL/AMRB
Mel Gazloff, Resident

Weather/Seasonality Observations: Sunny; hot; very slight breeze;
dry summer; rained two nights before investigation.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #7: Mill foundation
(note trailer park proximity); #8: TP-3 (south of RR tracks), east
1/4; #9: TP-3, east center 1/4; #10: TP-3, west center 1/4; #11:
TP-3, west 1/4; #12: TP-1 (north of RR tracks), east 1/3; #13: TP-
1, center 1/3; #14: TP-1, west 1/3; #15: TP-1, far west; #16: GW-1
sample location at golf course water tank; #17: GW-2 sample
location at residence; #18: TP-2 area in pasture near residence.
Video Tape No. 2

General Comments/Observations (not covered specifically in attached Inventory Forms):
Small volume of tailings have high arsenic and lead levels in
residential area. On-site resident is very concerned about
groundwater and child exposure.

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Remove
shallow tailings and contaminated soil north of railroad; replace
topsoil and revegetate. South of railroad, remove or encapsulate
in place.

Digitized by the Internet Archive
in 2014

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): JOSLYN STREET TAILINGS PA#: 25-501

Legal Description: T 10N ; R 4W ; Sec. 23 , NE 1/4 NE 1/4 SE 1/4

County: LEWIS & CLARK Mining District: HELENA

Latitude: N 46° 36' 49.1" Longitude: W 112° 03' 56"

Primary Drainage Basin and Code: Tenmile Creek/10030101

Secondary Drainage Basin: Tenmile Creek

USGS Quadrangle map name(s): Helena

Mine Type/Commodities: N/A

Activity Status: Active , Inactive/Exploration , Abandoned X .

Ownership: Known Y N X ; private/public? Private

Owner, Agent, or Contact (Include address and phone when available): Unknown

Relationship to other mines/sites in the area/district:

Immediately outside the city of Helena; north of trailer park on RR grade N&S

Regulatory Status (Activity by other agencies)? Hardrock permits?

Past Reclamation Activities? N/A

General site features: Elevation 3920' , Slope 0-3° , Aspect Flat

Land use: Mining , Recreational X , Residential X , Urban , Agricultural X , Other (Specify)

Area of disturbed/unvegetated lands? 3 acre(s) .

Site Dimensions: Approx. 200 feet x 400 feet

Predominant vegetation types: None on tailings; grasses and weeds on adjacent land.

Access: roads - good (paved) , poor (maintained dirt road) X , 4wd , trail .

Other logistical considerations (proximity to other sites). In Helena area; access north of RR off Joslyn Road, south of RR through trailer park.

Well logs within 1 mile radius; (Attach MBMG Well Log Printout(s): There are 388 wells reported within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). The site is underlain by Helena Valley alluvium. Site lies 0.5 mile east of Tenmile Creek. Water leaving the site would flow west to Tenmile Creek, which flows north to Lake Helena between 10 to 15 miles away.

Mining/milling history, ore type/tenor, host rock, gangue: Appears that some tailings were taken from a mill in the area and dumped at this location. Reportedly milled ores from Rimini and resident stated that some tailings were brought over from the East Helena Smelter.

Mine Operation?

Shafts - Yes___, No X, # ____, Comment_____
Adits - Yes___, No X, # ____, Comment_____
Pits - Yes___, No X, # ____, Comment_____
Placers - Yes___, No X, # ____, Comment_____
Other - Yes___, No X, # ____, Comment_____

Mill Operation? Yes X, No____. If yes answer the next three questions:

Period(s) of Operation: Unknown to possibly 1920s.

Origin of Ore Milled - Custom Mill X Dedicated Mill____; Number and names of mines that supplied mill feed: Unknown

Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting? Unknown; appears to be two kinds of tailings. Earlier jig tailings are probably gravity separation. Later tailings are floatation type.

Montana Bureau of Mines and Geology
Water Well Log Data

08/10/1994

Well No.	Location	Depth	Yield	Static Water Level
M:137168	10N 04W 15 ABB	105.0	135.0	23.00
62607	10N 04W 15 CAC	125.0	50.0	32.00
M:62608	10N 04W 15 D	60.0	0.0	14.00
M:122511	10N 04W 15 DA	138.0	12.0	20.00
M:62609	10N 04W 15 DB	47.0	15.0	25.00
M:62610	10N 04W 15 DBB	51.0	13.0	35.00
M:5781	10N 04W 15 DBBB	35.0	0.0	0.00
M:5782	10N 04W 15 DBBB	30.6	0.0	23.42
M:62611	10N 04W 15 DC	0.0	1.0	0.00
M:62612	10N 04W 15 DDBB	60.0	0.0	0.00
M:62587	10N 04W 14	48.0	125.0	2.00
M:62586	10N 04W 14	57.0	20.0	15.00
M:62592	10N 04W 14 B	80.0	20.0	11.00
M:62591	10N 04W 14 B	34.0	20.0	4.00
M:62589	10N 04W 14 B	195.0	98.0	3.00
M:62588	10N 04W 14 B	190.0	95.0	7.00
M:62590	10N 04W 14 B	45.0	30.0	1.00
M:62593	10N 04W 14 BBAA	18.0	7.0	0.00
M:62594	10N 04W 14 BBAA	18.0	7.0	0.00
M:5778	10N 04W 14 BBCB	0.0	0.0	0.00
M:127887	10N 04W 14 BC	190.0	15.0	40.00
M:62596	10N 04W 14 CC	12.0	0.0	6.00
M:62595	10N 04W 14 CC	49.0	36.0	4.00
M:62597	10N 04W 14 CCDC	41.0	20.0	3.00
M:62614	10N 04W 14 D	51.0	20.0	5.00
M:62598	10N 04W 14 D	72.0	20.0	4.00
M:62599	10N 04W 14 DC	220.0	250.0	10.00
M:62600	10N 04W 14 DCC	245.0	50.0	10.00
M:62601	10N 04W 14 DD	60.0	150.0	2.00
M:62572	10N 04W 13 B	135.0	10.0	20.00
M:62559	10N 04W 13 B	107.0	36.0	5.00
M:129418	10N 04W 13 BB	120.0	35.0	5.00
M:125805	10N 04W 13 BCA	160.0	20.0	10.00
M:62561	10N 04W 13 C	18.0	330.0	5.00
M:62562	10N 04W 13 CAC	59.0	20.0	0.00
M:62565	10N 04W 13 CB	35.0	20.0	6.00
M:62564	10N 04W 13 CB	85.0	20.0	5.00
M:62563	10N 04W 13 CB	132.0	25.0	8.00
M:138435	10N 04W 13 CCC	261.0	40.0	98.00
M:62566	10N 04W 13 CD	80.0	10.0	10.00
M:62567	10N 04W 13 D	67.0	20.0	30.00
M:62569	10N 04W 13 D	57.0	50.0	20.00
M:62568	10N 04W 13 D	72.0	30.0	15.00
M:120438	10N 04W 13 DA	225.0	25.0	30.00
M:62570	10N 04W 13 DA	70.0	35.0	12.00
M:125433	10N 04W 13 DAA	0.0	0.0	0.00
M:62573	10N 04W 13 DB	90.0	380.0	3.00
M:62574	10N 04W 13 DB	67.0	15.0	35.00
M:62576	10N 04W 13 DC	55.0	25.0	18.00
M:62577	10N 04W 13 DCA	150.0	30.0	20.00
M:62578	10N 04W 13 DCA	85.0	20.0	40.00
M:5776	10N 04W 13 DCAC	103.0	0.0	27.60
M:62579	10N 04W 13 DCAC	103.0	15.0	35.00
M:890593	10N 04W 13 DCAD	70.0	0.0	29.38
M:890591	10N 04W 13 DCAD	50.0	0.0	0.00
M:125627	10N 04W 13 DCB	59.0	25.0	16.00
M:5777	10N 04W 13 DCBD	0.0	0.0	0.00
M:127886	10N 04W 13 DCC	125.0	20.0	15.00

Montana Bureau of Mines and Geology
Water Well Log Data

08/10/1994

Well No.	Location	Depth	Yield	Static Water Level
M:62580	10N 04W 13 DCC	82.0	30.0	36.00
M:890587	10N 04W 13 DCCA	80.0	0.0	25.15
M:890588	10N 04W 13 DCCB	55.0	0.0	0.00
M:62581	10N 04W 13 DCD	92.0	25.0	34.00
M:128041	10N 04W 13 DCD	140.0	15.0	25.00
M:890592	10N 04W 13 DCDA	50.0	0.0	0.00
M:890589	10N 04W 13 DCDB	0.0	0.0	0.00
M:62583	10N 04W 13 DCDB	100.0	20.0	25.00
M:890594	10N 04W 13 DCDB	50.0	0.0	0.00
M:62582	10N 04W 13 DCDB	50.0	0.0	0.00
M:890595	10N 04W 13 DCDB	100.0	0.0	0.00
M:890590	10N 04W 13 DCDC	0.0	0.0	0.00
M:62584	10N 04W 13 DD	80.0	25.0	40.00
M:62585	10N 04W 13 DD	63.0	45.0	48.00
M:122606	10N 04W 13 DD	59.0	20.0	7.00
M:129419	10N 04W 13 DD	61.0	20.0	0.00
M:130985	10N 04W 22	45.0	20.0	20.00
M:62625	10N 04W 22	144.0	20.0	50.00
M:62621	10N 04W 22	57.0	30.0	20.00
M:62629	10N 04W 22	36.0	18.0	18.00
M:62633	10N 04W 22	49.0	15.0	20.00
M:62623	10N 04W 22	155.0	6.0	50.00
M:131901	10N 04W 22	0.0	15.0	0.00
M:62635	10N 04W 22	42.0	0.0	22.00
M:62627	10N 04W 22	198.0	15.0	30.00
M:62626	10N 04W 22	63.0	30.0	25.00
M:62631	10N 04W 22	57.0	15.0	30.00
M:62630	10N 04W 22	58.0	10.0	36.00
M:62622	10N 04W 22	52.0	20.0	15.00
M:62634	10N 04W 22	31.0	30.0	10.00
M:62624	10N 04W 22	22.0	355.0	0.00
M:62620	10N 04W 22	53.0	20.0	10.00
M:62712	10N 04W 22	86.0	10.0	12.00
M:62628	10N 04W 22	50.0	14.0	0.00
M:62640	10N 04W 22 A	45.0	20.0	18.00
M:62637	10N 04W 22 A	80.0	20.0	40.00
M:62639	10N 04W 22 A	42.0	30.0	6.00
M:62638	10N 04W 22 A	56.0	12.0	25.00
M:62636	10N 04W 22 A	41.0	30.0	14.00
M:62642	10N 04W 22 AA	75.0	20.0	25.00
M:62641	10N 04W 22 AA	59.0	12.0	10.00
M:62646	10N 04W 22 AC	64.0	15.0	19.00
M:62644	10N 04W 22 AC	34.0	14.0	34.00
M:62645	10N 04W 22 AC	60.0	0.0	0.00
M:62647	10N 04W 22 AC	57.0	15.0	25.00
M:62643	10N 04W 22 AC	62.0	15.0	24.00
M:62648	10N 04W 22 ACA	50.0	0.0	0.00
M:62650	10N 04W 22 ACAA	38.0	50.0	23.00
M:62649	10N 04W 22 ACAA	66.0	13.0	18.00
M:62651	10N 04W 22 ACAB	46.0	12.0	7.00
M:5783	10N 04W 22 ACAB	28.0	0.0	0.00
M:5784	10N 04W 22 ACAB	46.0	0.0	0.00
M:5785	10N 04W 22 ACAC	30.0	0.0	0.00
M:62652	10N 04W 22 ACAD	47.0	10.0	17.00
M:62653	10N 04W 22 ACB	44.0	120.0	6.00
M:62655	10N 04W 22 AD	32.0	10.0	16.00
M:62654	10N 04W 22 AD	46.0	8.0	31.00
M:62656	10N 04W 22 AD	58.0	20.0	28.00

Montana Bureau of Mines and Geology
Water Well Log Data

08/10/1994

Well No.	Location	Depth	Yield	Static Water Level
M:62657	10N 04W 22 BA	320.0	60.0	22.00
M:62658	10N 04W 22 BD	168.0	150.0	30.00
M:62659	10N 04W 22 CB	35.0	0.0	15.00
M:62660	10N 04W 22 CC	75.0	12.0	25.00
M:62662	10N 04W 22 CD	80.0	99.0	4.00
M:62661	10N 04W 22 CD	280.0	100.0	31.00
M:62664	10N 04W 22 CDDD	50.0	0.0	0.00
M:62665	10N 04W 22 CDDD	44.0	0.0	0.00
M:62663	10N 04W 22 CDDD	40.0	0.0	0.00
M:62667	10N 04W 22 D	56.0	12.0	18.00
M:62670	10N 04W 22 D	24.0	0.0	15.00
M:62672	10N 04W 22 D	45.0	30.0	12.00
M:62668	10N 04W 22 D	30.0	20.0	15.00
M:62666	10N 04W 22 D	42.0	0.0	0.00
M:62673	10N 04W 22 D	62.0	30.0	17.00
M:62669	10N 04W 22 D	45.0	35.0	25.00
M:62671	10N 04W 22 D	52.0	35.0	32.00
M:62674	10N 04W 22 DA	32.0	0.0	28.00
M:62675	10N 04W 22 DA	70.0	20.0	15.00
M:133850	10N 04W 22 DAC	71.0	20.0	28.00
M:62676	10N 04W 22 DAC	65.0	50.0	18.00
M:62677	10N 04W 22 DAC	25.0	10.0	0.00
M:62678	10N 04W 22 DB	64.0	24.0	23.00
M:62679	10N 04W 22 DB	60.0	20.0	30.00
M:62680	10N 04W 22 DB	58.0	30.0	20.00
M:62681	10N 04W 22 DB	46.0	15.0	40.00
M:62682	10N 04W 22 DBA	63.0	12.0	20.00
M:62683	10N 04W 22 DBB	96.0	0.0	26.00
M:62684	10N 04W 22 DBBD	0.0	10.0	0.00
M:62685	10N 04W 22 DBD	120.0	10.0	30.00
M:62686	10N 04W 22 DBDA	0.0	10.0	0.00
M:62687	10N 04W 22 DBDA	51.0	10.0	30.00
M:62688	10N 04W 22 DBDB	0.0	10.0	0.00
M:62689	10N 04W 22 DBDD	0.0	10.0	0.00
M:140663	10N 04W 22 DC	100.0	15.0	40.00
M:134700	10N 04W 22 DCC	149.0	10.0	46.00
M:62691	10N 04W 22 DD	0.0	0.0	15.00
M:62692	10N 04W 22 DD	24.0	0.0	15.00
M:62690	10N 04W 22 DD	45.0	0.0	0.00
M:62697	10N 04W 23	188.0	15.0	100.00
M:62719	10N 04W 23	35.0	0.0	15.00
M:62699	10N 04W 23	240.0	30.0	110.00
M:62726	10N 04W 23	110.0	45.0	60.00
M:62695	10N 04W 23	125.0	15.0	85.00
M:62722	10N 04W 23	85.0	35.0	44.00
M:62715	10N 04W 23	187.0	15.0	100.00
M:62702	10N 04W 23	40.0	25.0	10.00
M:62738	10N 04W 23	150.0	20.0	75.00
M:26718	10N 04W 23	38.0	20.0	28.00
M:62717	10N 04W 23	160.0	30.0	40.00
M:62730	10N 04W 23	110.0	20.0	58.00
M:706	10N 04W 23	227.0	20.0	146.00
M:62724	10N 04W 23	90.0	35.0	50.00
M:62700	10N 04W 23	126.0	15.0	77.00
M:62708	10N 04W 23	187.0	15.0	100.00
M:62728	10N 04W 23	20.0	0.0	0.00
M:62734	10N 04W 23	125.0	20.0	80.00
M:62713	10N 04W 23	140.0	20.0	60.00

Montana Bureau of Mines and Geology
Water Well Log Data

08/10/1994

Well No.	Location	Depth	Yield	Static Water Level
M:62736	10N 04W 23	100.0	20.0	50.00
M:62704	10N 04W 23	96.0	20.0	30.00
M:62720	10N 04W 23	147.0	0.0	55.00
M:62723	10N 04W 23	90.0	35.0	48.00
M:62740	10N 04W 23	97.0	20.0	30.00
M:62696	10N 04W 23	290.0	15.0	100.00
M:62732	10N 04W 23	110.0	30.0	70.00
M:62707	10N 04W 23	111.0	20.0	43.00
M:62727	10N 04W 23	80.0	30.0	46.00
M:62703	10N 04W 23	70.0	20.0	15.00
M:62729	10N 04W 23	80.0	20.0	46.00
M:62735	10N 04W 23	200.0	20.0	91.00
M:62731	10N 04W 23	110.0	8.0	42.00
M:62705	10N 04W 23	140.0	30.0	90.00
M:62714	10N 04W 23	187.0	10.0	85.00
M:62721	10N 04W 23	150.0	0.0	55.00
M:62694	10N 04W 23	80.0	35.0	38.00
M:62739	10N 04W 23	60.0	15.0	27.00
M:62725	10N 04W 23	100.0	30.0	56.00
M:62709	10N 04W 23	158.0	16.0	100.00
M:62718	10N 04W 23	54.0	15.0	15.00
M:62733	10N 04W 23	110.0	16.0	70.00
M:62698	10N 04W 23	269.0	15.0	100.00
M:62701	10N 04W 23	96.0	30.0	6.00
M:62710	10N 04W 23	155.0	25.0	112.00
M:62737	10N 04W 23	320.0	12.0	100.00
M:62741	10N 04W 23	185.0	26.0	135.00
M:62693	10N 04W 23	147.0	15.0	126.00
M:62716	10N 04W 23	187.0	15.0	100.00
M:62745	10N 04W 23 AA	0.0	0.0	0.00
M:62743	10N 04W 23 AA	0.0	2000.0	0.00
M:62742	10N 04W 23 AA	79.0	15.0	5.00
M:62744	10N 04W 23 AA	50.0	200.0	0.00
M:120735	10N 04W 23 AA	96.0	35.0	22.00
M:62747	10N 04W 23 AB	30.0	20.0	5.00
M:62746	10N 04W 23 AB	41.0	35.0	4.00
M:62748	10N 04W 23 ABBC	100.0	30.0	10.00
M:62751	10N 04W 23 AC	40.0	30.0	6.00
M:62750	10N 04W 23 AC	37.0	60.0	10.00
M:62749	10N 04W 23 AC	43.0	20.0	4.00
M:125806	10N 04W 23 AC	120.0	20.0	60.00
M:62753	10N 04W 23 ACD	55.0	20.0	30.00
M:62754	10N 04W 23 ACD	55.0	20.0	24.00
M:62752	10N 04W 23 ACD	0.0	10.0	0.00
M:62757	10N 04W 23 AD	48.0	25.0	22.00
M:62760	10N 04W 23 AD	46.0	25.0	30.00
M:62759	10N 04W 23 AD	59.0	40.0	37.00
M:62755	10N 04W 23 AD	33.0	22.0	29.00
M:131868	10N 04W 23 AD	56.0	80.0	12.00
M:62758	10N 04W 23 AD	44.0	140.0	27.00
M:62761	10N 04W 23 AD	110.0	150.0	34.00
M:62756	10N 04W 23 AD	53.0	12.0	48.00
M:62765	10N 04W 23 B	35.0	200.0	15.00
M:62763	10N 04W 23 B	30.0	40.0	4.00
M:62767	10N 04W 23 B	35.0	200.0	15.00
M:62766	10N 04W 23 B	35.0	200.0	15.00
M:62762	10N 04W 23 B	105.0	15.0	54.00
M:62764	10N 04W 23 B	35.0	0.0	15.00

Montana Bureau of Mines and Geology
Water Well Log Data

08/10/1994

Well No.	Location	Depth	Yield	Static Water Level
M:62768	10N 04W 23 BA	34.0	15.0	15.00
M:62769	10N 04W 23 BA	14.0	100.0	8.00
M:62770	10N 04W 23 BA	16.0	20.0	8.00
M:62772	10N 04W 23 BAC	24.0	20.0	6.00
M:62773	10N 04W 23 BAC	8.0	250.0	0.00
M:62771	10N 04W 23 BAC	38.0	20.0	6.00
M:62774	10N 04W 23 BAD	53.0	100.0	10.00
M:121619	10N 04W 23 BB	40.0	80.0	10.00
M:62775	10N 04W 23 BB	46.0	40.0	8.00
M:5788	10N 04W 23 BBBB	23.2	0.0	0.00
M:5790	10N 04W 23 BBBB	23.3	0.0	4.81
M:892150	10N 04W 23 BBCB	25.0	0.0	0.00
M:892152	10N 04W 23 BBCB	25.0	0.0	0.00
M:120878	10N 04W 23 BBCB	25.0	0.0	0.00
M:892149	10N 04W 23 BBCB	60.0	0.0	5.44
M:892151	10N 04W 23 BBCB	25.0	0.0	0.00
M:120879	10N 04W 23 BBCB	25.0	0.0	0.00
M:123560	10N 04W 23 BBCB	28.0	15.0	3.99
M:62776	10N 04W 23 BC	110.0	15.0	55.00
M:62806	10N 04W 23 BC	29.0	20.0	11.00
M:62777	10N 04W 23 BCD	60.0	35.0	5.00
M:62778	10N 04W 23 BD	71.0	90.0	10.00
M:62779	10N 04W 23 BDA	50.0	150.0	10.00
M:62780	10N 04W 23 C	215.0	20.0	100.00
M:131869	10N 04W 23 C	200.0	15.0	90.00
M:62781	10N 04W 23 CA	48.0	20.0	12.00
M:62782	10N 04W 23 CAA	40.0	20.0	15.00
M:62711	10N 04W 23 CAD	120.0	10.0	95.00
M:133855	10N 04W 23 CAD	165.0	20.0	50.00
M:62802	10N 04W 23 CADD	130.0	20.0	60.00
M:62783	10N 04W 23 CB	63.0	30.0	13.00
M:62784	10N 04W 23 CBA	39.0	20.0	15.00
M:62785	10N 04W 23 CBAB	41.0	20.0	17.00
M:62786	10N 04W 23 CBB	100.0	30.0	9.00
M:62787	10N 04W 23 CCA	273.0	14.0	114.00
M:120440	10N 04W 23 CD	210.0	30.0	80.00
M:62788	10N 04W 23 CD	125.0	14.0	107.00
M:121408	10N 04W 23 CD	190.0	20.0	70.00
M:62789	10N 04W 23 CD	125.0	20.0	40.00
M:131328	10N 04W 23 D	120.0	4.0	80.00
M:62791	10N 04W 23 D	125.0	20.0	70.00
M:131877	10N 04W 23 D	70.0	7.0	42.00
M:62790	10N 04W 23 D	81.0	60.0	54.00
M:62793	10N 04W 23 DAD	79.0	30.0	55.00
M:62792	10N 04W 23 DAD	110.0	18.0	70.00
M:62794	10N 04W 23 DADC	93.0	20.0	66.00
M:62796	10N 04W 23 DB	174.0	30.0	0.00
M:62797	10N 04W 23 DB	140.0	20.0	75.00
M:62795	10N 04W 23 DB	107.0	12.0	86.00
M:62799	10N 04W 23 DBAA	47.0	20.0	26.00
M:62798	10N 04W 23 DBAA	57.0	18.0	33.00
M:62800	10N 04W 23 DBD	120.0	30.0	77.00
M:62801	10N 04W 23 DC	126.0	20.0	98.00
M:62801	10N 04W 23 DD	124.0	30.0	96.00
M:122607	10N 04W 23 DDC	120.0	12.0	110.00
M:134136	10N 04W 24	73.0	25.0	35.00
M:62811	10N 04W 24	100.0	15.0	55.00
M:123121	10N 04W 24	77.0	20.0	40.00

Montana Bureau of Mines and Geology
Water Well Log Data

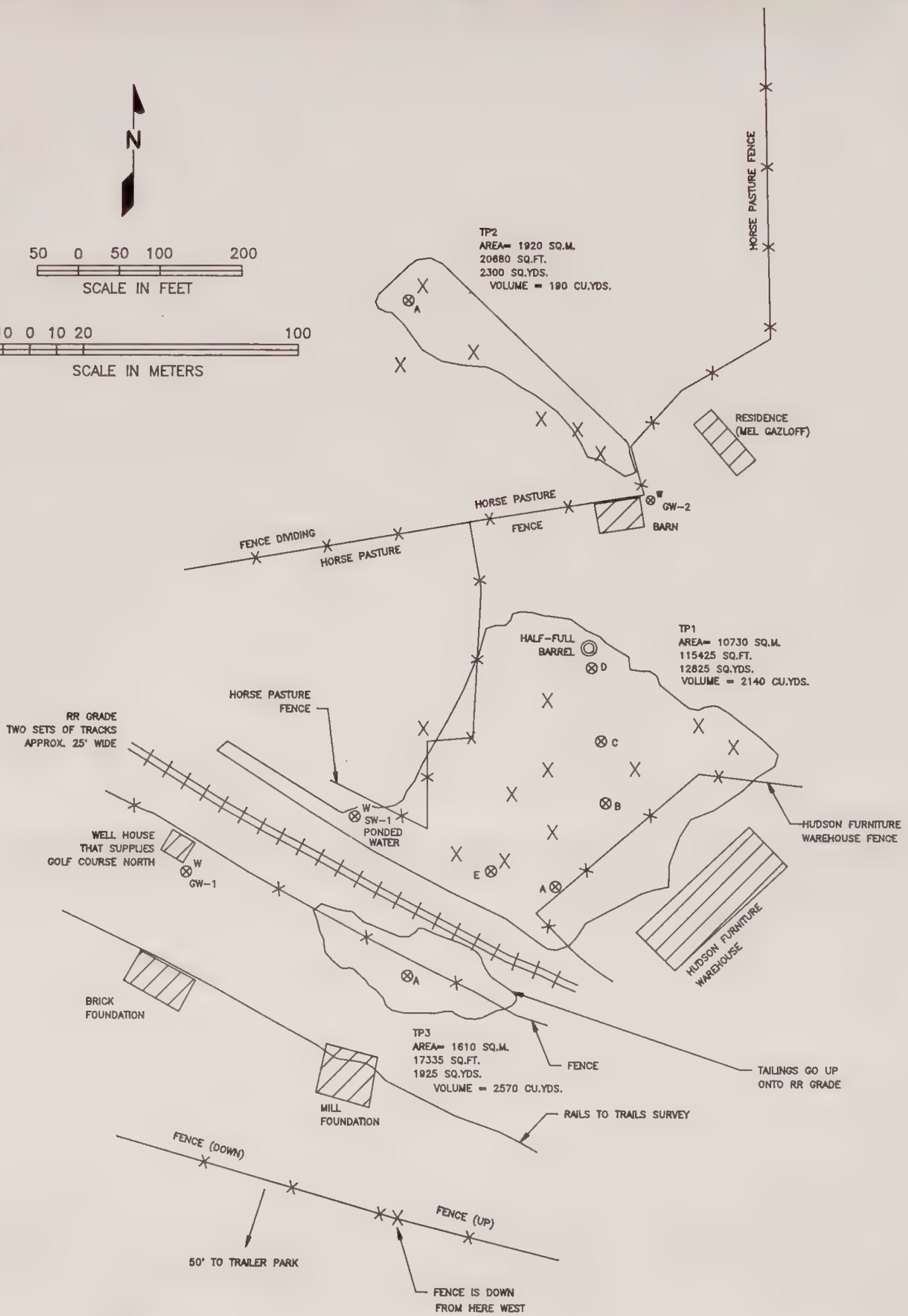
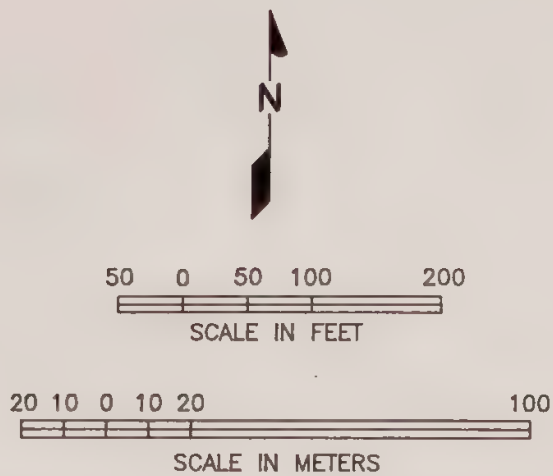
08/10/1994

Well No.	Location	Depth	Yield	Static Water Level
M:62804	10N 04W 24	50.0	18.0	20.00
M:62808	10N 04W 24	149.0	8.0	26.00
M:62809	10N 04W 24	120.0	30.0	46.00
M:62810	10N 04W 24	220.0	20.0	28.00
M:62805	10N 04W 24	65.0	8.0	40.00
M:62807	10N 04W 24	215.0	90.0	50.00
M:130192	10N 04W 24	80.0	8.0	37.00
M:62803	10N 04W 24	115.0	10.0	75.00
M:62812	10N 04W 24 A	101.0	12.0	25.00
M:62815	10N 04W 24 AA	79.0	25.0	40.00
M:62816	10N 04W 24 AA	140.0	20.0	35.00
M:62814	10N 04W 24 AA	115.0	18.0	50.00
M:62813	10N 04W 24 AA	80.0	15.0	30.00
M:134968	10N 04W 24 AAA	80.0	20.0	40.00
M:62818	10N 04W 24 AAB	84.0	20.0	30.00
M:62817	10N 04W 24 AAB	100.0	20.0	40.00
M:62819	10N 04W 24 ABBC	16.0	0.0	4.00
M:62820	10N 04W 24 ABBC	26.0	0.0	4.00
M:138510	10N 04W 24 ACA	119.0	30.0	81.00
M:62821	10N 04W 24 ACB	80.0	15.0	30.00
M:138437	10N 04W 24 ACC	119.0	40.0	75.00
M:62822	10N 04W 24 ACD	120.0	20.0	40.00
M:62823	10N 04W 24 AD	64.0	12.0	39.00
M:62825	10N 04W 24 ADB	75.0	15.0	35.00
M:62824	10N 04W 24 ADB	75.0	25.0	40.00
M:62827	10N 04W 24 ADC	72.0	20.0	38.00
M:62826	10N 04W 24 ADC	73.0	25.0	35.00
M:62828	10N 04W 24 ADD	140.0	20.0	50.00
M:140211	10N 04W 24 BA	121.0	20.0	15.00
M:138439	10N 04W 24 BAB	118.0	30.0	89.00
M:62829	10N 04W 24 BAD	30.0	90.0	7.00
M:122183	10N 04W 24 BBD	97.0	22.0	42.00
M:133858	10N 04W 24 BC	120.0	20.0	60.00
M:138438	10N 04W 24 BCB	334.0	50.0	36.00
M:62830	10N 04W 24 CAD	288.0	15.0	70.00
M:62831	10N 04W 24 CBA	135.0	30.0	68.00
M:125270	10N 04W 24 CBC	138.0	25.0	67.00
M:62832	10N 04W 24 CC	82.0	20.0	42.00
M:120016	10N 04W 24 DAA	116.0	20.0	47.00
M:62833	10N 04W 24 DAA	115.0	25.0	55.00
M:140708	10N 04W 24 DAAA	0.0	0.0	45.00
M:62834	10N 04W 24 DBAD	65.0	10.0	44.00
M:62835	10N 04W 24 DBBC	118.0	20.0	50.00
M:142034	10N 04W 24 DBC	140.0	28.0	60.00
M:62836	10N 04W 24 DBD	180.0	20.0	60.00
M:62837	10N 04W 24 DC	300.0	2.0	29.00
M:131880	10N 04W 24 DCA	74.0	15.0	35.00
M:62838	10N 04W 24 DCAA	190.0	30.0	100.00
M:62839	10N 04W 24 DCB	300.0	15.0	90.00
M:62840	10N 04W 24 DD	70.0	20.0	40.00
M:62841	10N 04W 24 DDA	74.0	75.0	22.00
M:125468	10N 04W 24 DDC	138.0	0.0	66.01
M:125466	10N 04W 24 DDC	110.0	0.0	97.18
M:125467	10N 04W 24 DDC	106.5	0.0	93.09
M:62849	10N 04W 25 AC	224.0	30.0	137.00
M:124544	10N 04W 25 ACDB	185.0	30.0	60.00
M:142035	10N 04W 25 CB	185.0	30.0	60.00
M:62855	10N 04W 26	300.0	30.0	100.00

Montana Bureau of Mines and Geology
Water Well Log Data

08/10/1994

Well No.	Location	Depth	Yield	Static Water Level
M:131885	10N 04W 26	185.0	20.0	97.00
M:62859	10N 04W 26	220.0	12.0	132.00
M:62857	10N 04W 26	195.0	5.0	163.00
M:62856	10N 04W 26	46.0	25.0	5.00
M:62854	10N 04W 26	300.0	40.0	100.00
M:62858	10N 04W 26	280.0	20.0	100.00
M:62861	10N 04W 26	300.0	20.0	150.00
M:62860	10N 04W 26	88.0	20.0	48.00
M:62862	10N 04W 26 A	250.0	5.0	150.00
M:131329	10N 04W 26 AAA	282.0	8.5	200.00
M:134705	10N 04W 26 AAB	255.0	12.0	143.00
M:129420	10N 04W 26 AAC	304.0	30.0	100.00
M:62867	10N 04W 26 AAC	340.0	15.0	100.00
M:62863	10N 04W 26 AB	275.0	70.0	80.00
M:131330	10N 04W 26 ABA	404.0	40.0	145.00
M:62864	10N 04W 26 ABD	280.0	20.0	120.00
M:128042	10N 04W 26 BA	400.0	35.0	100.00
M:62865	10N 04W 26 BA	280.0	30.0	120.00
M:128044	10N 04W 26 BAA	390.0	14.0	200.00
M:62866	10N 04W 26 BAA	365.0	60.0	100.00
M:62900	10N 04W 26 BBA	365.0	60.0	100.00
M:62876	10N 04W 27 AD	105.0	20.0	60.00
M:62878	10N 04W 27 ADA	31.0	20.0	19.00
M:62877	10N 04W 27 ADA	82.0	20.0	0.00
M:62880	10N 04W 27 B	220.0	15.0	45.00
M:62879	10N 04W 27 B	117.0	20.0	25.00
M:121014	10N 04W 27 BA	280.0	30.0	60.00
M:62881	10N 04W 27 BAA	31.0	25.0	13.00
M:62882	10N 04W 27 BAA	47.0	10.0	26.00
M:62883	10N 04W 27 BAC	160.0	30.0	6.00
M:62885	10N 04W 27 BB	25.0	0.0	0.00
M:62884	10N 04W 27 BB	40.0	0.0	0.00
M:62886	10N 04W 27 BB	48.0	0.0	0.00
M:62887	10N 04W 27 BB	63.0	5.0	24.00
M:62888	10N 04W 27 BBA	178.0	0.0	0.00
M:134560	10N 04W 27 BBC	570.0	10.0	40.00
M:62889	10N 04W 27 BC	228.0	20.0	60.00
M:62890	10N 04W 27 BC	213.0	5.0	21.00
M:62892	10N 04W 27 BCB	370.0	40.0	50.00
M:62893	10N 04W 27 DB	380.0	30.0	80.00



LEGEND

- ⊗ XRF SAMPLE
- ⊗ W WATER SAMPLE
GROUND AND SURFACE
- X POINTS ANALYZED FOR
DEPTH AND COLOR
- - - - - FENCE
- ==== IMPROVED ROAD
- ===== UNIMPROVED ROAD
- ▨ STRUCTURE
- ⬮ EXCAVATION
- ▲ SLOPE DIRECTION
- ⬮ WASTE ROCK DUMP
OR TAILINGS PILE

DRAWN FOR:



TITLE:

JOSLYN STREET TAILINGS
PA# 25-501

DRAWING NO.: PT340216
DATE: 12/3/94

REV: -
PLOT SCALE: 1 = 40

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): Top, 1" to 18" sandy silt/yellow gray tailings; next, 2" to 6" coarse, pebbly sand (probably jig tailings); lower (south of RR only), more sandy/silt gray tailings.

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): No impoundment. Deepest is south of RR, which is 4 feet (TP-3). TP-1 has an average depth of 6". TP-2 has an average depth of 3" (residential land).

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): Dry

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): No impoundment. Tailings are migrating via surface water overland flow to residential area.

Comments on potential for mitigation: Dig up and remove all tailings from the residential area; replace with clean soil and vegetate.

SOURCE INVENTORY FORM

SAMPLERS: Tuesday

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd ³)	LOCATION/DESCRIPTION	CONTAINMENT	pH SU (D/S)*	RADIO-ACTIVITY (MR/HR)	LAB. SAMPLE NO.	DATE/TIME	ANALYSES
TP-1A-1	TAIL	2,140	Large pond north of RR, southeast corner; 0-16"	None	< 3.5 (D)	0.02	25-501-TP-1A	07/27/94 1730	T-Metals, ABA, Cyanide
TP-1A-2	TAIL		18-21"	None	< 3.5 (D)	0.06	25-501-TP-1B	07/27/94 1730	T-Metals, ABA, Cyanide
TP-1B-1	TAIL		East side; 0-6"	None	3.9 (D)	0.04			
TP-1B-2	TAIL		10-12"	None	4.6 (D)	0.04			
TP-1C-1	TAIL		Center; 0-1"	None	< 3.5 (D)	0.06			
TP-1C-2	TAIL		4-8"	None	4.2 (D)	0.05			
TP-1D-1	TAIL		Northwest corner; 0-4"	None	< 3.5 (D)	0.04			
TP-1D-2	TAIL		8-9"	None	4.8 (D)	0.04			
TP-1E-1	TAIL		South center; 0-12"	None	< 3.5 (D)	0.04			
TP-1E-2	TAIL		14-16"	None	< 3.5 (D)	0.04			
TP-2A-1	TAIL	190	Northwest corner of residential; 3-6"	None	4.4 (D)	0.05	25-501-TP-2	07/27/94 1740	T-Metals, ABA, Cyanide
TP-2A-2	TAIL		6-9"	None	4.2 (D)	0.06			
TP-3A-1	TAIL	2,570	Small area south of RR, Center; 0-18"	None	< 3.5 (D)	0.04			
TP-3A-2	TAIL		18-22"	None	< 3.5 (D)	0.04	N/A	N/A	XRF Analysis
TP-3A-3	TAIL		22-30"	None	< 3.5 (D)	0.03	N/A	N/A	XRF Analysis
TP-3A-4	TAIL		30-38"	None	< 3.5 (D)	0.04	25-501-TP-3	07/27/94 1745	T-Metals, ABA, Cyanide
TP-3A-5	TAIL		38-42"	None	3.5	0.03			

*Direct reading (Kelsey Meter) ; 6-Saturated Paste (Orion Meter)

Comments or deviations from SOPs: 25-501-TP-1A is composite TP-1A-1, -1B-1, -1C-1, -1D-1, -1E-1, and -3A-1. 25-501-TP-1B is composite of TP-1A-2, -1B-2, -1C-2, -1D-2, and -1E-2. 25-501-TP-2 is composite of TP-2A-1 and -2A-2. 25-501-TP-3 is composite TP-3A-4 and -3A-5. See Franklin (25-339) for background soil sample (1993 inventory data).

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes___, No X, Number:___ Identification:_____

Filled shafts: Yes___, No X, Number:___ Identification:_____

Seeps/Springs: Yes___, No X, Number:___ Identification:_____

Groundwater wells within 4 miles?: Yes X, No___;

Number of well logs: 1,987

Distance to nearest well used for drinking:

X <1,000 ft; ___ 1,000 ft to 0.5 miles; ___ >0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite___, Probable___, Possible X, Unlikely___.

Uncontained source high in arsenic, lead, and zinc; low pH; moderate
depth to groundwater in alluvial aquifer.

Approximate Depth to Groundwater: ___ <25 ft; X 25 - 100 ft; ___ >100 ft.

Other observations/notes: Residential well 75 feet deep; SWL is
unknown.

SAMPLERS: Clark

Flow: Estimated (E) or Measured (M) from edit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes____, No X, Name(s):_____

Dry streambeds: Yes____, No X, Name(s):_____

Other surface water: Yes X, No____, Name(s)/Description: Ponded water on tailings

Waste materials within any floodplain: Yes____, No X Source ID(s):_

Approximate Flood frequency?__1 yr,__10 yr,__100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? N/A

High Flow:_____, Average Flow:_____

Distance between waste source(s) and nearest surface water body (ft)?
0.5 mile to Tenmile Creek

Surface water draining onto or through waste sources: Yes____, No X,
Describe:_____

Surface water use within 15 miles downstream? (Drinking water supply, irrigation,
residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Irrigation, recreational, fishery, wetlands

Observed erosional/sedimentation/stream turbidity problems? Yes____,
No X. Distance downstream (ft)? 0-500____; 500-1,000____; >1,000____.
Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures
or channel changes present): _____

SAMPLERS: Tuesday, Clark

id (N) posnswen 30 (2) potwjt,jsz : 1072

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO₃)
Presence of evaporative salt deposits? (ESD)
Discolored or turbid seepage? (SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?
Presence of ferric hydroxide precipitates? (FEOX)
Presence of burned or stressed vegetation? (VEG)
pH \leq 5.0 (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? < 50 acres, flat Helena Valley

Wetlands present: Yes___, No X, Describe:_____

Carbonate rocks/soils: Yes___, No X, Describe:_____

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10___; 10-30___; 30-100___;
100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or
greater X; Comments City of Helena

Nearest residence: X <1,000 ft; ___ 1,000 ft - 0.5 miles; ___ >0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

SAMPLERS: Tuesday

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes X, No
Describe: Residence on-site; warehouse workers east of site; trailer park south of site.

Population within 1 mile: 1-10 ; 10-30 ; 30-100 ; 100-300 ;
300-1,000 ; 1,000-3,000 ; 3,000-10,000 X; 10,000 or greater ;
Comments

Evidence of recreational use on site: Yes X, No , Describe: Vehicle and motorcycle tracks in residential area.

Accessibility (check each that apply): Easily accessible - no fences, gates, or warning signs; X Moderately Accessible - barbed wire fences, road gated, or signs posted; Difficult Access - chain-link fence, road gated and locked, site guarded (does not include locked or manned access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes , No X, Comment
Wilderness Area - Yes , No X, Comment
T&E Species Habitat - Yes , No X, Comment
Bat Habitat - Yes , No X, Comment

Primary Drainage X; Secondary Drainage X; No Information :

Riparian Habitat Quality - High , Medium , Low X

Wetlands Frontage - High , Medium , Low X

Fisheries Habitat and Species Classification - 4

Sport Fishery Classification - 4

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes , No X, Number , types and locations:

Hazardous structures: Yes , No X, Number , types and locations:

Unstable highwalls, pits, trenches, slopes: Yes , No X, Number , types and locations:

Unstable waste piles, impoundments, undercut banks: Yes , No X, Number , types and locations:

Fire and/or Explosion hazards: Yes , No X, Explain:

Bibliography

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0,
Prepared by Montana Natural Resource Information System, December
1989.

Olympus Environmental, Inc., Site Characterization Report for Joslyn
Street Tailings Site, Helena, Montana, Project No. 5267, Prepared
for Burlington Northern Railroad, November 7, 1994.

USGS, Topographic Map, Helena, Montana, 7 1/2 minute Quadrangle, 1985.

LABORATORY ANALYTICAL DATA

**JOSLYN STREET TAILINGS
PA NO. 25-501**

Joslyn Street Tailings PA# 25-501
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - TUESDAY
INVESTIGATION DATE: 07/27/94

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	Ag (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
25-501-TP1A	36.7 JX	13900	20.2	19.1 J	1.8	3.2 J	98.9	25300	0.22	47.5	2.6 U	3730	56.9	1900	1.522
25-501-TP1B	1.4 JX	8520	129	41.3 J	9.3	19.2 J	407	47200	0.08	1050	7.4	557	16.3	6130	0.657
25-501-TP2	59.0 JX	11800	137	6.4 J	1.7 U	27.3 J	432	58000	0.32	108	3.3	8650	54.0	1010	2.18
25-501-TP3	72.5 JX	29300	5.5	128 J	9.7	19.5 J	464	59700	0.16	571	3.3	9230	238	16400	<0.253
BACKGROUND	NR	27.1	165 JX	1.3 J	13.6	17.9	29.7	23300	0.071 JX	672	17.9 J	36.3 J	6.98 UJ	76.4	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL POTENT.		SULFUR ACID BASE POTENT.		SULFATE SULFUR		PYRITIC SULFUR		ORGANIC SULFUR		PYRITIC SULFUR ACID BASE POTENT.		SULFUR ACID BASE POTENT.	
	%	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t
25-501-TP1A	1.68	52.5	-8.08	-61	0.57	-18.4	0.78	10.3	0.33	0.00	0.25	0.00	0.00	0.50	0.00	-96.8
25-501-TP1B	3.99	125	-7.88	-133	3.74	-7.88	0.03	0.00	<0.01	0.03	0.03	0.00	0.50	0.00	0.50	-96.8
25-501-TP2	1.83	57.2	0.50	-57	1.80	-57	0.03	0.00	<0.01	0.03	0.03	0.00	0.50	0.00	0.50	-96.8
25-501-TP3	5.55	173	-29.7	-203	<0.01	-203	3.61	67.2	2.15	0.00	0.03	0.00	0.50	0.00	0.50	-96.8

WATER MATRIX ANALYSES

Metals in Water
Results in ug/L

FIELD ID	Ag	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
25-501-GW1	0.12 U	9.3	52.3	0.13	8.4 U	6.8 U	5.9 U	14.0	0.18	2.3 U	14.4 U	4.2 J	3.4	15.6 U	343
25-501-GW2	0.12 U	4.5	49.6	0.09	8.4 U	6.8 U	5.9 U	12.3 U	0.11 U	2.3 U	14.4 U	1.1 U	2.4 U	20.3	196

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Wet Chemistry
Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
25-501-GW1	447	29	81	4.92	<0.005
25-501-GW2	257	<5	38	0.85	<0.005

LEGEND

- TP1A - Composite of subsamples TP1A-1, 1B-1, 1C-1, 1D-1, 1E-1, and 1A-1.
TP1B - Composite of subsamples TP1B-1, 1B-2, 1C-2, 1D-2, and 1E-2.
TP2 - Composite of subsamples TP2A-1, and 2A-2.
TP3 - Composite of subsamples TP3A-4 and 3A-5.
BACKGROUND - From the Franklin Mine (25-330-SS1) (1993 Data).
- GW1 - GW well for tank applying water for golf course irrigation, probably up or co-gradient.
GW2 - Residential well downgradient (north) of tailings (cutoff residence).

XRF ANALYSIS RESULTS

**JOSLYN STREET TAILINGS
PA NO. 25-501**

Mine Name: Joslyn Street Tailings PA# 25-501

XRF Field Analyses

Results in PPM

XRF SAMPLE I.D.	CrHI	K	Ca	Ti	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Sr
25-501-TP1A1		13063.8	2441.45	689.072			26627.4			102.231 *	3423.77	10560.4	25.0029 *
25-501-TP1A2		13140	17555.3	983.602		1484.38	50147.4	420.446		662.745	10737.6	7380.54	135.4
25-501-TP1A-COMP		20072.3	2396.23	1029.01			18065.9			118.13 *	1008.01	10887.8	37.5034 *
25-501-TP1B1		14935.2	2576.94	644.678	211.255 *	496.014 *	19658			107.143 *	369.407	19405.3	21.6298 *
25-501-TP1B2		11247.1	36582.8	770.479		722.171 *	58003.2			350.52 *	3608.19	13970.3	189.546
25-501-TP1B-COMP		16024.9	34282.4	1405.56		1860.52 *	55659.2			418.211	5092.16	8155.75	194.163
25-501-TP1C1		22281	5602.34	958.579		495.219 *	13613.7			114.758 *	300.662	6964.6	50.1951
25-501-TP1C2		14122.8	28241.3	1214.66		2262.71 *	80743.5			219.544 *	448.19	20894.9	209.43
25-501-TP1D1		19692.4	3264.07	1099.01		1585.67 *	22870.2			100.192 *	407.179	11948.2	73.0932
25-501-TP1D2		18027.4	36201.7	1769.68			36405.4			296.294 *	1512.95	567.052	179.526
25-501-TP1E1		27428.7	1508.72	1320.57			6224.77			75.2912 *	465.597	3977.29	29.3027 *
25-501-TP1E2		10952.2	41552.6	813.265		4015.22	50672			591.564	11270.7	15163.2	148.298
25-501-TP2A1		21652.4	31637.5	702.006 *		544.265 *	38454.9			230.181 *	537.955	3163.95	156.967
25-501-TP2A2		20906	6993.1	1354.74			71182.8			438.145	1469.47	3163.95	159.329
25-501-TP2-COMP		21718.8	12889.3	1261.11		537.065 *	63002.8			361.714 *	1042.61	8354.13	164.321
25-501-TP3A1		15468	1633.16	745.384			18648.4			90.8015 *	1777.91	11307.2	14.5891 *
25-501-TP3A2		13265.7	2506.66	592.26		677.871 *	29571.6	471.551 *		152.381 *	3194.93	12627.5	19.6838 *
25-501-TP3A3		14052.2	2508.46	555.824		768.989 *	16390.1			180.098 *	3151.93	5283.73	18.5121 *
25-501-TP3A4	734.615 *	24456.2	2464.8	632.758 *			42920.7	697.137 *	146.361 *	652.253	13996.6	19805.4	36.8007 *
25-501-TP3A5	1277.3 *	11276.2	2485.04	395.742 *		1800.09 *	57716.2	1147.6 *	317.902 *	609.384	9518.5	41962.5	28.8958 *
25-501-TP3-COMP	1319.09 *	19276.8	2016.55	682.104	243.209 *	1838.06 *	48481.7			426.713	11583.4	26113.6	16.4372 *
	513.846 *					1162.32 *							

XRF SAMPLE I.D.	Zr	Hg	Mo	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th
25-501-TP1A1	75.6004		13.1452 *	1351.89	84.388			134.537 *				
25-501-TP1A2	125.14		16.5013 *	702.451	78.6986						12.5749 *	
25-501-TP1A-COMP	86.9137		12.7398 *	2260.63	137.586			130.253 *	214.054			25.2886 *
25-501-TP1B1	79.1121		16.6007 *	2351.29	112.687			130.738 *				19.911 *
25-501-TP1B2	127.566		11.6036 *	452.641	53.7865 *				181.642			
25-501-TP1B-COMP	186.312		12.4772 *	375.488	87.5109 *				274.124			14.1653 *
25-501-TP1C1	81.7854		11.0488 *	2619.4	152.218			130.391 *	75.2163 *			23.6544 *
25-501-TP1C2	181.893		24.1304 *	551.973	84.1052 *				260.143			20.4687 *
25-501-TP1D1	68.7484		10.0412 *	2518.27	140.625			143.748 *	115.126 *			19.4143 *
25-501-TP1D2	207.484		14.0358 *	54.5254 *	93.964				360.521			13.1618 *
25-501-TP1E1	114.382		8.34099 *	880.986	172.276			95.7809 *	61.2243 *			17.2453 *
25-501-TP1E2	107.898		15.3808 *	151.601 *	49.3676 *				133.699 *			
25-501-TP2A1	70.1956		20.2753 *	7864.13	174.143			230.764 *	141.738 *			30.5775 *
25-501-TP2A2	150.989		14.7985 *	1587.62	123.429				301.227			30.9476 *
25-501-TP2-COMP	104.935		23.2198 *	5042.74	162.737				195.763			46.325 *
25-501-TP3A1	134.326		11.8708 *	2918.68	111.502							
25-501-TP3A2	125.659	79.547 *	20.3337 *	4621.57	109.401			165.91 *				28.334 *
25-501-TP3A3	92.2626	84.1684 *	12.5283 *	1478.27	102.329			145.096 *				41.4732 *
25-501-TP3A4	96.504	297.664 *	31.885 *	5669.04	188.632	304.108 *		148.368 *				65.9634 *
25-501-TP3A5	87.4638	284.515 *	31.1941 *	7956.4	111.212 *	234.649 *		61.2035 *				55.1157 *
25-501-TP3-COMP	67.9806		22.7071 *	5217.95	121.903			402.535				
								348.658				

* = Estimated Quantity

\$ = Unvalidated Data

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**JOSLYN STREET TAILINGS
PA NO. 25-501**

AIMSS SCORESHEET

SITE NAME: Joslyn Street Tailings
PA NUMBER: 25-501

LINE NO.		GROUNDWATER PATHWAY	
1		OBSERVED RELEASE	0
2		EXCEEDENCES	0
3A	GW - LIKELIHOOD OF RELEASE	CONTAINMENT	20
3B		GW DEPTH	20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B 400
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C 400
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 67.595
6	GW - TARGETS	WELLS - 1 MI. x 2.5	970.0
7		WELLS - 1 TO 4 MI	1599
8		NEAREST WELL	10
9		TARGETS SCORE	LINES 6 + 7 + 8 2579.0
10		GROUNDWATER SCORE	LINES 4 x 5 x 9 69731002
SURFACE WATER PATHWAY			
11		OBSERVED RELEASE	0
12		EXCEEDENCES	0
13A	SW - LIKELIHOOD OF RELEASE	CONTAINMENT	20
13B		DISTANCE TO SW	2
13C		POTENTIAL TO RELEASE	LINES 13A x 13B 40
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C 40
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 69.311
16	SW - TARGETS	DRINKING WATER POP'N	0
17		IMPACTED DRAINAGE	0
18		WETLANDS	10
19		FISHERY	1
20		RECREATION	5
21		IRRIGATION/STOCK	2
22		T & E SPECIES HABITAT	0
23		TARGETS SCORE	SUM LINES 16 THRU 22 18
24		SURFACE WATER SCORE	LINES 14 x 15 x 23 49904
AIR PATHWAY			
25		OBSERVED RELEASE	0
26A	AIR - LIKELIHOOD OF RELEASE	CONTAINMENT	20
26B		DISTANCE TO POPULATION	20
26C		POTENTIAL TO RELEASE	LINES 26A x 26B 400
27		LIKELIHOOD SCORE	LINES 25 + 26C 400
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 20.206
29	AIR - TARGETS	POPULATION - 4 MILES	10000
30		NEAREST RESIDENCE	10
31		WETLANDS	0
32		PARKS / WILDERNESS	0
33		T & E SPECIES HABITAT	0
34		TARGETS SCORE	SUM LINES 29 THRU 33 10010
35		AIR PATHWAY SCORE	LINES 27 x 28 x 34 80904824
DIRECT CONTACT PATHWAY			
36		OBSERVED EXPOSURE	250
37A	LIKELIHOOD OF EXPOSURE	ACCESSIBILITY	20
37B		DISTANCE TO POPULATION	20
37C		POTENTIAL EXPOSURE	LINES 37A x 37B 400
38		LIKELIHOOD SCORE	LINES 36 + 37C 650
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 19.682
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE	3000
41		NEAREST RESIDENCE	10
42		RECREATIONAL USE	20
43		TARGETS SCORE	SUM LINES 40 THRU 42 3030
44		DIRECT CONTACT SCORE	LINES 38 x 39 x 43 38763699
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE (LINES 10 + 24 + 35 + 44) / 100,000		1894.49

SITE NAME: Joslyn Street Tailings
 PA NUMBER: 25-501

LINE NO.	SITE SAFETY		
1	THREAT	ACCESSIBILITY	20
2	HAZARDS	OPEN SHAFTS 100 EA.	0
3		OPEN ADITS 50 EA.	0
4		UNSTAB. HIWALLS / PITS 75 EA.	0
5		HAZ. STRUCTURES 40 EA.	0
6		EXPLOSIVES	0
7		HAZ. MATERIALS	0
8		HAZARDS SCORE SUM LINES 2 THRU 7	0
9	TARGETS	POPULATION - 1 MILE	3000
10		NEAREST RESIDENCE	10
11		RECREATIONAL USE	20
12		TARGETS SCORE SUM LINES 9 THRU 11	3030
13	SITE SAFETY SCORE (LINES 1 x 8 x 12) / 1,000		0.00

SUMMARY OF HISTORICAL ANALYTICAL DATA
FROM OTHER SOURCES

TABLE 3. Metals and pH in Tailings, Ore/Waste Rock and Native Soils

Sample ID	Paste pH (SU)	Ag (mg/Kg)	As (mg/Kg)	Be (mg/Kg)	Cd (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Hg (mg/Kg)	Pb (mg/Kg)	Ni (mg/Kg)	Sb (mg/Kg)	Se (mg/Kg)	Ti (mg/Kg)	Zn (mg/Kg)
J-091594-T-1	1.87	29.6	4160	<0.2	15.8	<0.8	39.9	0.140	2750	<4	17	<0.2	<0.18	713
J-091594-T-2	2.22	29.2	4730	<0.2	15.0	<0.8	107	0.270	2280	<4	21	<0.2	<0.18	498
J-091594-T-3	3.16	41.1	9570	<0.2	28.3	<0.8	88.9	1.09	2720	<4	30	<0.2	<0.18	452
J-091594-T-4	3.41	23.5	7400	<0.2	22.8	2.8	85.9	0.280	2930	<4	37	<0.2	<0.18	363
J-091594-T-5	1.81	36.7	15500	<0.2	58.1	1.0	129	0.180	2420	4	64	<2.0	<1.80	2480
J-091594-T-6	1.55	51.4	9480	<0.2	32.9	4.3	88.9	0.180	6770	<4	38	<2.0	<0.18	1520
J-091594-T-7	2.36	34.6	3200	<0.2	10.0	2.6	71.7	0.120	4170	<4	44	<0.2	<0.18	444
J-091694-T-8	2.14	33.0	3020	<0.2	10.8	2.9	65.8	0.180	4120	<4	42	<0.2	<0.18	439
J-091694-T-9	2.01	65.6	1360	<0.2	4.4	<0.8	43.8	0.780	4900	<4	59	<0.2	<0.18	311
J-091694-T-11	4.92	108	8730	<0.2	16.3	1.7	205	0.780	18800	<4	98	<0.2	<1.80	472
J-091694-T-12	5.30	35.8	7780	<0.2	29.6	7.3	151	0.330	4090	5	43	<0.2	<1.80	460
Maximum	5.30	100	15500	<0.2	50.1	7.3	205	1.09	10800	5	98	<0.2	<0.18	2460
Minimum	1.55	23.5	1360	<0.2	4.4	1	39.9	0.12	2200	4	17	<0.2	<1.80	311
Mean	2.80	44.4	8830.0	NA	22.2	3.2	90.8	0.4	5087.3	NA	44.8	<0.2	NA	739.4
J-092094-T-14	1.75	48.0	25000	<0.2	60.2	<0.8	150	10.1	5400	5	80	<2.0	<1.80	854
J-091594-S-1	5.69	4.3	806	1.0	357	8.7	859	0.160	145	19	22	<0.2	<1.80	52100
J-091594-S-2	4.60	2.0	1980	0.5	165	7.4	317	<0.1	167	10	<8	<0.2	<1.80	28000
J-091594-S-3	5.81	2.5	3060	0.7	198	7.7	181	<0.1	328	17	<8	<0.2	<1.80	27800
J-091594-S-4	6.88	2.0	313	0.7	29.3	12.4	45.3	<0.1	79	16	<8	<0.2	<1.80	4100
J-091594-S-5	5.19	4.0	3930	1.1	158	8.8	317	<0.1	88	4	13	<0.2	<1.80	26000
Maximum	6.88	4.3	3930	1.1	357	12.4	859	0.16	328	19	22	<0.2	<1.80	52100
Minimum	4.60	2.00	313.00	0.50	29.3	7.4	45.3	<0.1	79	4	<8	<0.2	<1.80	4100
Mean	5.63	3.0	2017.8	0.8	181.1	9.0	343.9	0.2	161.4	13.2	17.5	NA	NA	27820.0
J-091594-S-1A	8.0	<0.40	16.9	0.200	<0.40	6.11	18.1	<0.1	18.5	4.90	<4.8	0.2	<0.18	45.7
J-091594-S-3A	8.2	<0.40	14.6	<0.20	<0.40	8.65	17.8	<0.1	16.0	4.30	<4.8	<0.20	<0.18	602
J-091594-S-5A	7.9	<0.40	62.9	0.250	<0.40	6.90	11.8	<0.1	32.9	12.1	<4.8	<0.20	0.2	1350
Maximum	8.2	<0.40	62.9	0.25	<0.40	8.65	18.1	<0.1	32.9	12.1	<4.8	0.2	0.2	1350
Minimum	7.9	<0.40	14.6	0.20	<0.40	6.11	11.8	<0.1	16.0	4.30	<4.8	<0.20	<0.18	45.7
Mean	8.0	<0.40	31.5	0.23	<0.40	7.22	15.9	<0.1	22.5	7.10	<4.8	0.07	0.07	665.9
J-092094-S-13	7.66	1.5	60	0.4	1.3	7.8	31.8	0.120	92	10	<8	0.308	<0.18	154

LEGEND

- T-1 thru T-5, T-8 Tailings north of railroad tracks
T-6 thru T-8 Tailings south of railroad tracks (T-7 & 8 duplicates)
T-11 and T-12 Tailings in pasture northwest of barn
T-14 Composite of 3 ore rock piles south of railroad tracks
S-1 thru S-5 Native soil 6" interval at contact with tailings
S-3A thru S-5A Native soil 1' interval below 6" contact zone
S-13 Background soil sample

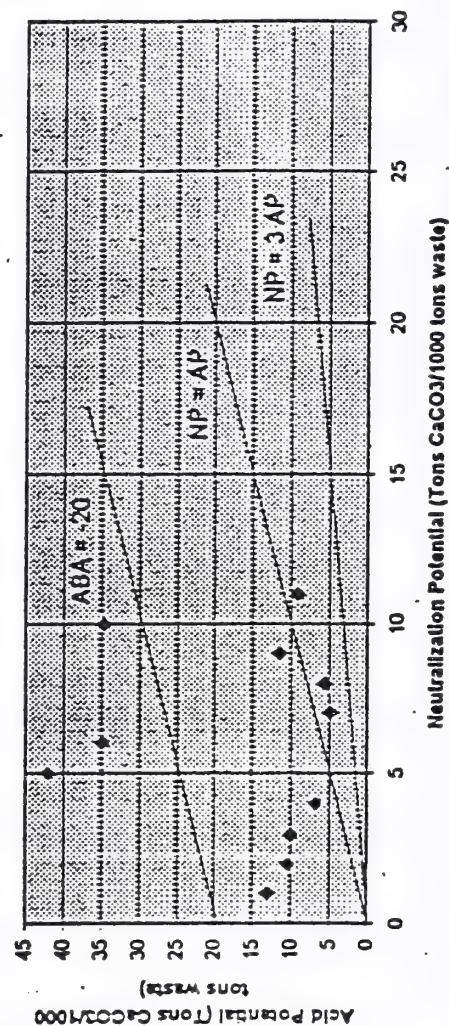
TABLE 4. Summary Of Tailings Acid/Base Accounting Results

Sample ID	Total Sulfur (%)	Pyritic Sulfur (%)	Sulfate Sulfur (%)	Non-Ext Sulfur (%)	Acid Gen Potential *	Neutraliz Potential *	Acid/Base Potential *
J-091594-T-1	0.67	0.42	0.24	<0.01	13.1	6.9	-6.2
J-091594-T-2	0.43	0.34	0.08	<0.01	10.5	10.6	0.1
J-091594-T-3	0.45	0.32	0.12	<0.01	10.1	11.1	1.0
J-091594-T-4	0.53	0.22	0.30	<0.01	6.9	11.6	4.7
J-091594-T-5	2.40	1.35	0.72	0.33	42.1	<0.3	-42.1
J-091594-T-6	1.45	1.12	0.23	0.10	35.0	<0.3	-35.0
J-091594-T-7	0.34	0.16	0.17	0.01	5.0	6.3	1.3
J-091594-T-8	0.36	0.18	0.17	0.01	5.7	10.0	4.3
J-091594-T-9	0.89	0.37	0.52	<0.01	11.5	10.0	-1.5
J-091594-T-11	3.65	1.11	2.53	<0.01	34.8	9.0	-25.8
J-091594-T-12	0.83	0.29	0.53	<0.01	9.2	15.8	6.6

LEGEND

T-1 thru T-5, T-9 Tailings north of railroad tracks
T-6 thru T-8 Tailings south of railroad tracks (T-7 & 8 duplicates)
T-11 and T-12 Tailings in pasture northwest of barn

TAILINGS STATIC TEST (AP vs. NP)



* Tons of CaCO3 equivalent per 1000 tons of material

TABLE 6. Summary Of Soil Sampling Results For Ryan Ballfields

Sample #	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)
HBR-SS-01	10	41	<1	<5	<5	18	8170	<1	210	<5	20	<1	31
HBR-SS-02	15	41	<1	<5	<5	19	6560	<1	210	<5	26	<1	33
JST02-SS-1	5.1		0.2								25.9		
JST02-SS-2	5.8		0.3								22.5		
JST02-SS-3	6		0.3								30.5		
JST02-SS-4	4.5		0.2								22.3		
JST02-SS-5	8.4		0.3								32.3		
JST02-SS-6	12.2		0.3								25		
JST02-SS-7	6.4		0.3								30.4		
JST02-SS-8	4.7		0.3								28.1		
JST02-SS-9	5.5		0.2								28.8		
JST02-SS-10	5		0.2								25.9		
JST02-SS-11	4.2		0.2								23.3		
JST02-SS-12	5.8		0.3								20.8		
JST02-SS-13	11.1		0.4								33.4		
JST02-SS-14	19.4		0.5								39.8		
JST02-SS-15	16.5		0.4								26.7		
JST02-SS-16	16.5		0.3								27.3		
JST02-SS-17	15.4		0.4								34		
JST02-SS-18	15.5		0.4								31.5		
JST02-SS-19	13.4		0.3								22.2		
JST02-SS-20	12.8		0.3								22.3		
JST02-SS-21	16.8		0.4								30.1		
JST02-SS-22	12.2		0.3								20.7		
JST02-SS-23	14.6		0.4								29.2		
JST02-SS-24	22.5		0.5								33.3		
JST02-SS-25	22.2		0.5								26.2		
Maximum	22.5		0.5								39.8		
Minimum	4.2		0.2								20		
Mean	11.4		0.33								27.3		

Samples HBR-SS-01 and HBR-SS-02 were collected from Ryan Ballfield #2 on 7/28/94
 Samples JST02-SS-1 thru JST02-SS-12 were collected from Ryan Ballfield #1 on 7/77
 Samples JST02-SS-13 thru JST02-SS-25 were collected from Ryan Ballfield #2 on 7/77 (JST02-SS-24 & 25 Duplicates)

TABLE 6. Summary of Tailings Grain Size Analysis and Chemistry Results

Grain Size Sieve Analysis												
Sample Numbers and % Finer Fractions												
Sieve #	Micron	HLNDHC1 HLNDHC2 HLNDHC3 HLNDHC4 HLNDHC5 HLNDHC6										
		% Finer	% Finer	% Finer	% Finer	% Finer	% Finer	% Finer	% Finer	% Finer	% Finer	% Finer
20	840	93	91	92	89	98	91	98	91	98	91	98
40	420	90	67	73	79	92	79	92	80	92	80	92
60	250	84	52	60	65	72	65	72	66	72	66	72
140	105	18	33	41	14	17	14	17	16	17	16	17
200	74	7.8	23	29	4.7	7.1	4.7	7.1	6.8	7.1	6.8	7.1
325	44	2.2	1.5	24	2.0	2.4	2.0	2.4	2.9	2.4	2.9	2.4

Minus 325 Mesh Fraction Analytical Results												
Sample ID	Ag (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Hg (mg/Kg)	Pb (mg/Kg)	Ni (mg/Kg)	Zn (mg/Kg)		
HLNDHC1	18.0	8764	57.8	14.3	4.02	80.4	0.28	3796	4.02	1376		
HLNDHC2	34.2	4125	134	8.09	4.58	233	0.62	3955	4.02	525		
HLNDHC3	39.5	5964	75.9	11.0	4.01	154	0.58	6536	4.01	464		
HLNDHC4	26.8	11412	96.5	20.3	4.01	119	0.32	3313	4.01	1640		
HLNDHC5	49.4	12407	25.2	12.2	6.92	148	0.48	9742	4.01	1429		
HLNDHC6	25.8	12462	89.4	20.1	4.01	130	0.48	3323	4.01	1603		
Maximum	49.4	12462	134	20.3	6.92	233	0.62	9742	4.02	1640		
Minimum	18.0	4125	25.2	8.09	4.01	80.4	0.28	3313	4.01	525		
Mean	32.6	8965.1	79.8	14.3	4.8	147.2	0.46	5465.0	4.01	1020.3		

* Sample HLNDHC6 is duplicate of HLNDHC4

TABLE 7. Summary of Ground Water Sampling Results

Sample ID	Location	Date	pH (SU)	Ag (ug/L)	As (ug/L)	Ba (ug/L)	Cd (ug/L)	Co (ug/L)	Cr (ug/L)	Cu (ug/L)	Fe (ug/L)	Hg (ug/L)	Mn (ug/L)	Ni (ug/L)	Pb (ug/L)	Sb (ug/L)	Zn (ug/L)	SO4 (mg/L)	TDS (mg/L)
GW-1 (Total)	Golf Course well	7/27/94	7.56	0.12U	9.3J	52.3J	4U	8.6U	6.8U	5.9U	14J	0.18J	2.3U	1.14U	4.2	51.6U	15.6U	81.0	447
GW-2 (Total)	Gasloff well	7/27/94	7.77	0.12U	4.5J	49.8J	4U	8.8U	6.8U	5.9U	12.3U	0.11U	2.3U	14.4U	1.1U	51.8U	20.3	30.0	257
JST-GW-01-101194 (Total)	Gasloff well	8/11/94	<1.0	<1.0	2.0	34.0	<1.0	<50.0	<1.0	<1.0	<10.0		<5.0	<20.0	<1.0	<1.0	<1.0		
J-100784-W1 (Total)	Gasloff well	10/7/94	7.43		<1.0		<0.2								1.0	1.0	4.55	35.4	222
J-100784-W1 (Dissolved)	Gasloff well	10/7/94			4.0		<0.2								1.0		131		
J-100784-W2 (Dissolved)	Gasloff well	10/7/94			<1.0		<0.2								<1.0		35.5		
J-100784-W3 (Total)	Duplicate W1	10/7/94			<1.0		<0.2								<1.0		7.1		
J-100784-W4 (Total)	Field Blank	10/7/94			4.0		<0.2								2.0		5.7	75.8	374
J-100784-W4 (Dissolved)	Golf Course well	10/7/94	7.27		5.0		<0.2								2.0		30.5		
J-100784-W5 (Total)	Golf Course well	10/7/94	7.25		<1.0		<0.2								1.0		48.0	97.9	448
J-100784-W5 (Dissolved)	Reynolds MHP well	10/7/94			<1.0		<0.2								<1.0		59.2		
J-100784-W5 (Dissolved)	Reynolds MHP well	10/7/94																	
Primary DW MCL	40 CFR Part 141			50	50	1000	5		100	1000	300	2	50		50		5000	250	500
Secondary DW MCL	40 CFR Part 143		6.5-8.5																
MT WQ Human Health	Circular WQ-7	7/15/94		NA	0.018	1000	5	NA	100	1000	300	0.14	50	100	15	14	5000	NA	NA
MT Required Report Value	Circular WQ-7	7/15/94		NA	3.18	5	0.1	NA	1	1	10	0.638	5	20	3.18	3.18	10	1	100
Tennile WTP (Tot Recov)		12/30/91	7.54	<1	3	8	<1		<5		10	<0.2	23		<1			18.4	
Tennile WTP (Tot Recov)		1/93-4/94			6	U	1		U	333		U		U	2	U		12	
Missouri WTP (Tot Recov)		6/14/88	7.40	<1	13	40	<1		<5		<1	<0.2	<5		<5			47.1	
Missouri WTP (Tot Recov)		6/08-9/93			6	U	U		U	U		U		U	<5	U		10	

GW-1 and GW-2 collected by Pioneer Technical Services, Inc.

JST-GW-01-101194 collected by MDHES Superfund

J-100784-W1 thru J-100794-W5 collected by Olympus Environmental, Inc.

Tennile and Missouri WTP data provided by WTP management personnel

U- Not Detected; J- Estimated Quantity; NA- Not Available



25-501, #7: Mill foundation (Note: Trailer park proximity)



25-501, #8: East quarter of TP-3 (south of railroad tracks)



25-501, #9: East center quarter of TP-3 (south of railroad tracks)



25-501, #10: West center quarter of TP-3 (south of railroad tracks)



25-501, #11: West quarter of TP-3 (south of railroad tracks)



25-501, #13: Center third of TP-1 (north of railroad tracks)



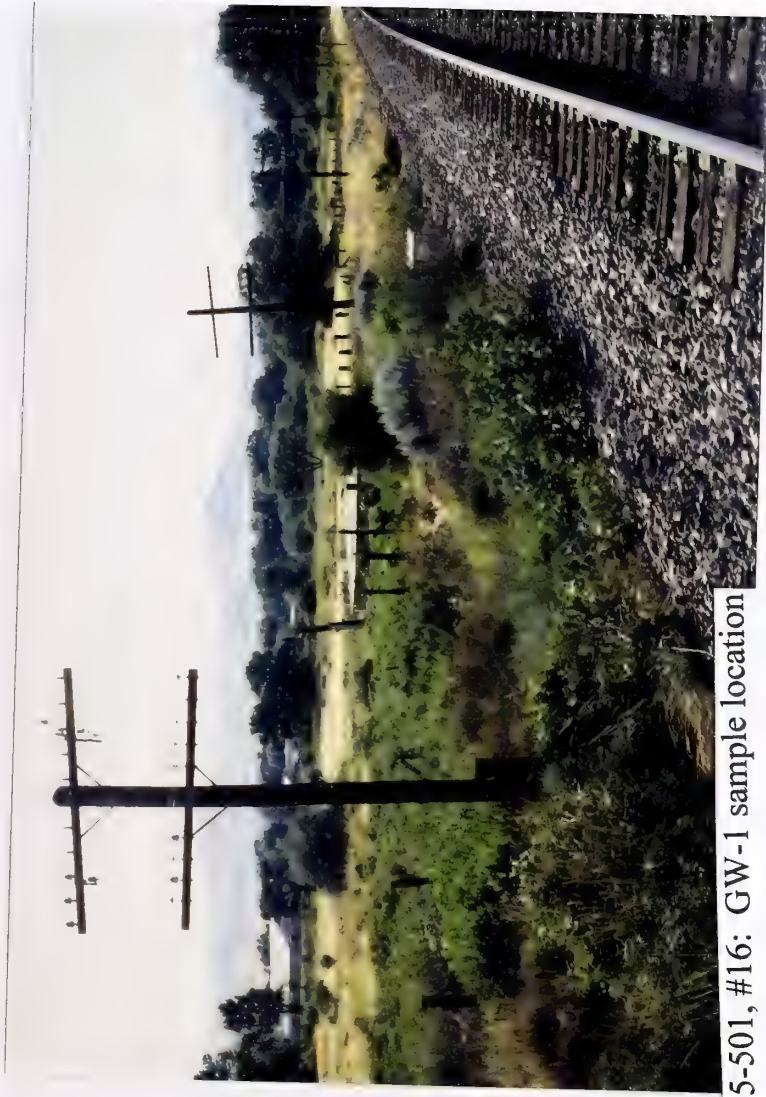
25-501, #12: East third of TP-1 (north of railroad tracks)



25-501, #14: West third of TP-1 (north of railroad tracks)



25-501, #15: Far west of TP-1 (north of railroad tracks)



25-501, #16: GW-1 sample location

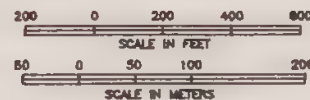


25-501, #17: GW-2 sample location



25-501, #18: TP-2 area in pasture near residence





TOWN OF
MARYSVILLE

MARYSVILLE ROAD

ASSAY OFFICE

MILL

WR4
AREA= 8150 SQ.M.
87720 SQ.FT.
9750 SQ.YDS.
VOLUME= 3280 CU. YDS.

SW-2
SE-2

TAILINGS POND
TP1
AREA= 3875 SQ.M.
41695 SQ.FT.
4630 SQ.YDS.
VOLUME= 4630 CU. YDS.

WR3
AREA= 2390 SQ.M.
25680 SQ.FT.
2850 SQ.YDS.
VOLUME= 2850 CU. YDS.

MILL FOUNDATION

POND

AD1

SILVER CREEK

RAWHIDE GULCH

OTTAWA GULCH ROAD

OTTAWA GULCH

SW-1
SE-1

APPROX. 4200 FT.

SILVER CREEK

SAWMILL GULCH

MARYSVILLE ROAD

OLD TIMBER DAM

BREACH

SW-3
SE-3

TP2
AREA= 21840 SQ.M.
235,000 SQ.FT.
26,110 SQ.YDS.
VOLUME= 174000 CU. YDS.

BEAVER PONDS
AREA= 12,000 SQ.M.
129,100 SQ.FT.
14,350 SQ.YDS.

LEGEND

	XRF SAMPLE		IMPROVED ROAD
	WATER SAMPLE GROUND AND SURFACE		UNIMPROVED ROAD
	OPEN ADIT		STRUCTURE
	COLLAPSED ADIT		TAILINGS POND
	DRAINAGE		PONDED WATER
	DRY DRAINAGE		SLOPE DIRECTION
			WASTE ROCK DUMP OR TAILINGS PILE

DRAWN FOR:

PIONEER
TECHNICAL SERVICES, INC.

TITLE:

DRUMLUMMON
PA# 25-024
MAP 2 OF 2

DRAWING NO.: PT340254
DATE: 12/3/94

REV: -
PLOT SCALE: 1" = 150'

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): TP-1 is silt and fine sand with uniform distribution. TP-2 is mostly sand and silt with frequent layers of clay.

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): TP-1 is less than 3 feet deep at deepest point with no stratification. TP-2 is 22 feet deep at the dam with no consistent stratification (clays and sand/silt).

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): TP-1 is dry, but completely vegetated. TP-2 is partially wetted by Silver Creek flowing through it and beaver pond on west end.

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): TP-1 is bermed on 3 sides with 1 opening in the berm above the tailings level; adequate freeboard, well vegetated, pipe for overflow. TP-2 dam is breached in 2 places; 1 breach is temporarily blocked, but Silver Creek flows through the other breach.

Comments on potential for mitigation: TP-1 is already well revegetated. TP-2 is fairly well vegetated by willows except where actively eroding and dammed by beavers. Create bypass channel for Silver Creek through, over, or around TP-2.

SOURCE INVENTORY FORM

SAMPLERS: Tuesday, Belanger, West

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd ³)	LOCATION/DESCRIPTION	CONTAINMENT	pH SU (D/S) *	RADIO-ACTIVITY (mR/HR)	LAB. SAMPLE NO.	DATE/TIME	ANALYSES
WR-1	WR	630	Shaft #4 at headframe; northeast part of hill	None	6.0 (D)	0.05	25-024-WR-1	06/27/94 1510	T-Metals, ABA
WR-2	WR	2,200	Shaft #2 along road; southwest part of hill	None	6.1 (D)	0.05			
WR-3	WR	2,850	Top of pile east of mill	None	6.3 (D)	0.03	25-024-WR-2	06/27/94 1515	T-Metals, ABA
WR-4A	WR	3,280	East side of pile west of mill	None	5.2 (D)	0.03			
WR-4B	WR		Middle of pile west of mill	None	6.8 (D)	0.05			
WR-4C	WR		West side of pile west of mill	None	6.4 (D)	0.05			
TP-1	TAIL	4,630	Northwest corner of TP-1 pile	Fair to Good	4.6 (D)	0.03	N/A	N/A	XRF Analysis
TP-2A-1	TAIL	174,000	East end of TP-2 in gully of breach; 0-3'	Poor/None	5.8 (D)	0.04	25-024-TP-1	06/27/94 1520	T-Metals, ABA, Cyanide
TP-2A-2	TAIL		East end of TP-2 in gully of breach; 3-6'	Poor/None	5.8 (D)	0.03			
TP-2A-3	TAIL		East end of TP-2 in gully of breach; 6-9'	Poor/None	5.7 (D)	0.035			
TP-2A-4	TAIL		East end of TP-2 in gully of breach; 9-12'	Poor/None	5.7 (D)	0.035			
TP-2A-5	TAIL		East end of TP-2 in gully of breach; 12-15'	Poor/None	6.0 (D)	0.03			
TP-2A-6	TAIL		East end of TP-2 in gully of breach; 15-18'	Poor/None	6.1 (D)	0.04			
TP-2A-7	TAIL		East end of TP-2 in gully of breach; 18-21'	Poor/None	6.2 (D)	0.05			
TP-2A-8	TAIL		East end of TP-2 in gully of breach; 21-21.5', underlying soil	Poor/None	5.8 (D)	0.03	N/A	N/A	

*D-Direct reading (Halway Meter); S-Saturated Paste (Orion Meter)

SOURCE INVENTORY FORM (Cont'd)

SAMPLERS: Tuesday, Belanger, West

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd ³)	LOCATION/DESCRIPTION	CONTAIN- MENT	pH SU (D/S) *	RADIO- ACTIVITY (mR/HR)	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
TP-2B-1	TAIL		South side, middle; 0-3'	Poor/None	6.0 (D)	0.04	25-024-TP-2	06/27/94 1530	T-Metals, ABA, Cyanide
TP-2B-2	TAIL		South side, middle; 3-4'	Poor/None	6.4 (D)	0.03			
TP-2B-3	TAIL		South side, middle; 4-9'	Poor/None	6.3 (D)	0.035			
TP-2B-4	TAIL		South side, middle; 9-14'	Poor/None	6.0 (D)	0.035			
TP-2C-1	TAIL		West side below beaver pond; 0-4'	Poor/None	5.7 (D)	0.03			
TP-2C-2	TAIL		West side below beaver pond; 5-8'	Poor/None	6.2 (D)	0.03			
TP-2C-3	TAIL		West side below beaver pond; 8-9.5'	Poor/None	5.9 (D)	0.04			
SS-1	SOIL		Background soil on Drumlummon Hill ridge top	N/A	NM	NM	25-024-SS-1	06/23/94 0900	T-Metals

D-Direct reading (Kelway Meter); S-Saturated Paste (Orion Meter)

Comments or deviations from SOPs: 25-024-WR-1 is composite of WR-1 and -2. 25-024-WR-2 is composite of WR-3 and WR-4A through -4C. 25-024-TP-1 is composite of subsamples TP-2A-1 through -7. 25-024-TP-2 is composite of all subsamples of TP-2B and TP-2C. NM = Not Measured

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes X, No , Number: 1 Identification: AD-1

Filled shafts: Yes , No X, Number: Identification:

Seeps/Springs: Yes , No X, Number: Identification:

Groundwater wells within 4 miles?: Yes X, No ;

Number of well logs: 97

Distance to nearest well used for drinking:

X <1,000 ft; 1,000 ft to 0.5 miles; >0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite , Probable , Possible X, Unlikely .

Adit discharges onto WR-4 and seeps through it. TP-1 collects water in
closed basin which seeps through. Water at 6 feet in TP-2 tailings
Beaver pond is in Silver Creek on top of west portion of TP-2.

Approximate Depth to Groundwater: X (Tailings) <25 ft;

X (Mine area) 25 - 100 ft; >100 ft.

Other observations/notes: N/A

SAMPLERS: West

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

MDSL AMRB/PIONEER 5/16/94

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes X, No , Name(s): Ottawa Gulch, Silver Creek

Dry streambeds: Yes , No X, Name(s):

Other surface water: Yes X, No , Name(s)/Description: Adit discharge and collection pond

Waste materials within any floodplain: Yes X, No Source ID(s): WR-4, TP-1, TP-2

Approximate Flood frequency? X 1 yr, 10 yr, 100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? 2 cfs

High Flow: 30 cfs, Average Flow: 3 cfs

Distance between waste source(s) and nearest surface water body (ft)? 0 feet; Silver Creek flows through TP-2.

Surface water draining onto or through waste sources: Yes X, No , Describe: Adit discharges onto WR-4. Silver Creek flows through TP-2.

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?) Fishery, wetlands, stock watering, possible irrigation.

Observed erosional/sedimentation/stream turbidity problems? Yes X, No . Distance downstream (ft)? 0-500 ; 500-1,000 ; >1,000 X. Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): Blowout of TP-2 - tailings are deposited for miles downstream.

SURFACE WATER INVENTORY FORM

SAMPLERS: Tuesday, Belanger, West

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SAMPLE LOCATION	pH SU	SC μS/cm @ 25°C	Temp °C	ALK. mg/L as CaCO ₃	Flow cfs/gpm	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
SW-1	SW	Ottawa Gulch (Silver Creek) upstream of mines and mills	6.96	194	11.1	97	1.73 cfs (M)	25-024-SW-1	06/23/94 1300	T-Metals, TDS, Hardness, Cl, SO ₄ , NO ₂ /NO ₃
SE-1	SE	Ottawa Gulch (Silver Creek) upstream of mines and mills	N/A	N/A	N/A	N/A	N/A	25-024-SE-1	06/23/94 1300	T-Metals
SW-2	SW	Silver Creek below mines, mills, and TP-1	6.46	170	14.1	97	2.03 cfs (M)	25-024-SW-2	06/23/94 1700	T-Metals, TDS, Hardness, Cl, SO ₄ , NO ₂ /NO ₃
SE-2	SE	Silver Creek below mines, mills, and TP-1	N/A	N/A	N/A	N/A	N/A	25-024-SE-2	06/23/94 1700	T-Metals
SW-3	SW	Silver Creek below TP-2, 2 miles below mills	6.53	183	12.1	NM	3.06 cfs (M)	25-024-SW-3	06/23/94 1800	T-Metals, TDS, Hardness, Cl, SO ₄ , NO ₂ /NO ₃
SE-3	SE	Silver Creek below TP-2, 2 miles below mills	N/A	N/A	N/A	N/A	N/A	25-024-SE-3	06/23/94 1800	T-Metals

FLOW: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): SW-3 alkalinity was not measured due to excessive turbidity.

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides?	(SO ₃)
Presence of evaporative salt deposits?	(ESD)
Discolored or turbid seepage?	(SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?	
Presence of ferric hydroxide precipitates?	(FEOX)
Presence of burned or stressed vegetation?	(VEG)
pH \leq 5.0	(pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? 3 to 4 acres near mill sites; 15 to 20 acres currently occupied by tailings

Wetlands present: Yes X, No , Describe: Beaver pond in Silver Creek floodplain area

Carbonate rocks/soils: Yes X, No , Describe: Literature states stock intruded into sediments and limestones.

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10 ; 10-30 ; 30-100 ; 100-300 X; 300-1,000 ; 1,000-3,000 ; 3,000-10,000 ; 10,000 or greater ; Comments Marysville is immediately west of the site.

Nearest residence: X <1,000 ft; 1,000 ft - 0.5 miles; >0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:

observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Tuesday, Belanger, West

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH/MODERATE/LOW/NONE)
WR-1	None	Dry	4,270	1,495	Yes	Low
WR-2	None	Dry	19,810	9,905	Yes	Low
WR-3	FEOX	Dry	25,680	23,110	Yes	Low
WR-4	FEOX	Dry	87,720	26,310	Yes	Moderate
TP-1	pH	Dry	41,695	0	No	None
TP-2	FEOX	Partial	235,000	70,500	Yes	Moderate

Notes and Clarifications: Area for TP-2 does not include portion flooded by the beaver ponds.

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X
Describe: Logging near TP-2

Population within 1 mile: 1-10____; 10-30____; 30-100 X; 100-300____;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____;
Comments_____

Evidence of recreational use on site: Yes X, No____, Describe: Beer cans; campfire rings; motorcycle tracks

Accessibility (check each that apply): X Easily accessible - no fences, gates, or warning signs;____ Moderately Accessible - barbed wire fences, road gated, or signs posted;____ Difficult Access - chain-link fence, road gated and locked, site guarded (does not include locked or manned access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment_____
Wilderness Area - Yes____, No X, Comment_____
T&E Species Habitat - Yes____, No X, Comment_____
Bat Habitat - Yes____, No X, Comment_____

Primary Drainage X; Secondary Drainage X; No Information____:

Riparian Habitat Quality - High____, Medium X, Low____

Wetlands Frontage - High____, Medium X, Low____

Fisheries Habitat and Species Classification - 3

Sport Fishery Classification - 4

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes X, No____, Number 4, types and locations:____
There are several unfenced openings, mostly shafts (open shafts appear deep, with some unfenced).

Hazardous structures: Yes X, No____, Number 1, types and locations:____
Loadout associated with WR-1 is high, heavy, and ready to fall.

Unstable highwalls, pits, trenches, slopes: Yes X, No____, Number 2, types and locations:____
Highwalls associated with two large, open, unfenced pits

Unstable waste piles, impoundments, undercut banks: Yes X, No____, Number 1, types and locations:____
Active erosion and undercutting of TP-2 by Silver Creek in several locations.

Fire and/or Explosion hazards: Yes____, No X, Explain:_____

Bibliography

MBMG, Form 39, 1966-1972.

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0,
Prepared by Montana Natural Resource Information System, December
1989.

MDSL/AMRB Files, Abandoned Mine Lands Portal Inventory Form for
Drumlummon, Prepared by Daphne Diggrindakis, October 26, 1983.

MDSL/AMRB Files, Abandoned Mine Reclamation Inventory Field Forms for
Drumlummon, Prepared by Northern Engineering and Testing, May 21
and June 20, 1988.

USGS, Ore Deposits of the Helena Mining Region, Montana, Bulletin 527,
Written by Adolph Knopf, 1913.

USGS, Topographic Map, Granite Butte, Montana, 7 1/2 minute Quadrangle,
1968.

Wade, W.R., Reopening the Drumlummon Mine...With Notes on the Economic
Geology of the Marysville, Montana District, From Mining World,
V.7, No.7, June 1945.

LABORATORY ANALYTICAL DATA

DRUMLUMMON MINE/MILLSITE
PA NO. 25-024

Drumlumon Mine/Mill PA# 25-024
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - TUESDAY
INVESTIGATION DATE: 06/23 & 24/94

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	Ag (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
25-024-SE1	1.9	30.5	148 J	0.8	6.1	13.9 J	38.8	16100	0.18	1050 J	7.7	203	6.2 U	196	NR
25-024-SE2	4.5	19.8	150 J	0.7	6.0	8.7 J	30.6	13100	6.20	490 J	6.4	62.0	7.4 U	73.7	NR
25-024-SE3	18.8	13.5	71.8 J	1.5	3.9	9.0 J	60.7	9120	3.78	742 J	4.9	77.7	5.4 U	123	NR
25-024-TP1	27.4	33.7	99.2	0.7	4.3	12.5	149	11100	1.94 JX	744	8.0	112	16.1 J	257 J	0.401
25-024-TP2	27.4	35.1	61.3	0.7	3.0	10.2	116	9230	1.85 JX	626	5.9	117	12.9 J	205 J	0.219
25-024-WR1	0.4 U	21.7	46.2	0.4 UJ	5.6	16.9	30.1	23300	0.41 JX	491	9.8	12.1	4.3 UJ	59.6 J	NR
25-024-WR2	5	46.2	57.0	2.8 J	4.2	9.3	55.3	13200	1.43 JX	727	6.1	119	5.7 UJ	311 J	NR
BACKGROUND	0.7 U	8.2	312 J	0.6 U	5.6	15.0 J	12.1	14500	0.03 U	454 J	9.8	8.56 U	6.9 U	58.1	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	TOTAL SULFUR ACID BASE 1/1000t	NEUTRAL POTENT 1/1000t	SULFUR ACID BASE POTENT 1/1000t	SULFATE SULFUR %	PYRITIC SULFUR %	ORGANIC SULFUR %	PYRITIC SULFUR ACID BASE 1/1000t	SULFUR ACID BASE POTENT 1/1000t
25-024-TP1	0.01	0.31	72.6	72.3	<0.01	<0.01	0.01	0.00	72.6
25-024-TP2	0.01	0.31	82.0	81.7	<0.01	<0.01	0.01	0.00	82.0
25-024-WR1	0.04	1.25	153	152	<0.01	0.07	0.05	2.19	151
25-024-WR2	0.15	4.69	91.3	86.6	0.07	0.03	0.05	0.94	90.4

WATER MATRIX ANALYSES

Metals in Water
Results in ug/L

FIELD ID	Ag	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn (mg CaCO3/L)	HARDNESS CALC.
25-024-AD1	0.14	34.9	128	2.6 U	8.7 U	4.7 UX	4.6 U	2140	0.11 U	1640	8.0 U	2.1	29.4 U	6.07	319
25-024-SW1	0.12 U	2.2	94.0	2.6 U	8.7 U	4.9 JX	4.6 U	44.1	0.11 U	8.0	9.8	2.9	29.4 U	6.67	144
25-024-SW2	0.12 U	2.1	81.9	2.6 U	8.7 U	4.7 UX	4.6 U	91.4	0.11 U	21.8	8.0 U	2.3	29.4 U	4.5 U	139
25-024-SW3	0.12 U	3.6	74.4	2.6 U	8.7 U	5.9 JX	7.3	262	0.11 U	41.3	8.0 U	5.8	29.4 U	13.7	188

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Wet Chemistry
Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
25-024-AD1	309	<5	24	<0.05	NR
25-024-SW1	137	<5	8.0	0.15	NR
25-024-SW2	148	<5.0	12	0.16	NR
25-024-SW3	177	<5	18	0.14	NR

LEGEND

SE1 - Otter Gulch (Silver Creek) upstream of mine and mill.
 SE2 - Silver Creek below mine, mill, and TP1.
 SE3 - Silver Creek below tailings from TP2, two miles below mill.
 TP1 - Composite of subsamples TP2A-1 through 2A7.
 TP2 - Composite of subsamples TP2B and 2C.
 WR1 - Composite of subsamples WR1 and 2.
 WR2 - Composite of subsamples WR3 and 4A through 4C.
 BACKGROUND - From the Drumlumon Mine/Mill (25-024-SS1).

AD1 - Acid discharge on WR4.
 SW1 - Same as sample 25-024-SE1.
 SW2 - Same as sample 25-024-SE2.
 SW3 - Same as sample 25-024-SE3.

XRF ANALYSIS RESULTS

**DRUMLUMMON MINE/MILLSITE
PA NO. 25-024**

Mine Name: Drumlun Mine/Millsite PA# 26-024
XRF Field Analyses
Results in PPM

XRF SAMPLE I.D.	CrHI	K	Ca	Ti	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Sr
25-024-TP1		15864.5	16477.2	681.565 *		820.407 *	15730.5				430.767	126.269 *	173.455
25-024-TP1-COMP		27261.9	27718.6	1015.73		829.432 *	12459		138.995 *	93.2082 *	305.664	98.9403 *	109.211
25-024-TP2A1		16124.6	33892.4	638.454 *		884.984 *	7157.81				143.959 *	62.2038 *	122.185
25-024-TP2A2		26313.1	36956.2	1144.48		1157.35 *	13989.3				213.328 *	53.888 *	137.49
25-024-TP2A3		26573.5	27430.3	1079.02		1118.23 *	12001.8			202.231 *	335.357	163.825 *	93.8152
25-024-TP2A4		25338.6	23920.3	1144.92		1710.97 *	13990.7			173.629 *	412.587	153.527 *	80.2895
25-024-TP2A5		32642.9	20705.8	1588.77		897.194 *	14575			207.666 *	344.853	75.444 *	115.733
25-024-TP2A6		30299.9	20116.8	1318.58		881.713 *	11936.3			167.669 *	289.597	95.8956 *	110.122
25-024-TP2A7		31727.4	26558.5	1448.22		1123.24 *	16352		158.861 *	157.329 *	408.224	81.26 *	109.662
25-024-TP2A8		22139.8	34291.8	1597.31		507.563 *	16222.4	394.034 *			209.046 *	80.1755 *	117.257
25-024-TP2B1		25806.1	53412	1304.62		1635.52 *	12244.4				251.828 *	64.1006 *	162.262
25-024-TP2B2		28278.6	41077.6	1422.51		1126.07 *	16995.4				171.919 *	68.0045 *	132.141
25-024-TP2B3		19455.4	45099.9	1092.18		1124.26 *	10238.1			224.743 *	446.134	89.6411 *	95.346
25-024-TP2B4		24749.8	24282.7	1013.91		994.793 *	9481.68			91.9165 *	178.801 *	65.5419 *	124.022
25-024-TP2C1		19593.8	36867	962.245		898.219 *	8381.44				157.324 *		119.954
25-024-TP2C2		18028.4	31758.9	730.403		857.543 *	8988.15			105.625 *	229.24 *	59.3374 *	88.3057
25-024-TP2C3		18585.8	20258.9	787.597		565.002 *	7893.56			137.687 *	177.341 *	88.3525 *	98.8094
25-024-TP2-COMP		18353.4	26681.4	741.535		838.505 *	8823.43				204.293 *	76.589 *	97.2307
25-024-WR1		10611.8	51330.2	774.805		849.978 *	21268.5				157.654 *	105.475 *	74.3015
25-024-WR1-COMP		12779.7	49476.6	1092.58		790.756 *	18185.2				168.615 *	101.618 *	91.7968
25-024-WR2		13262	34622.6	1288.51		664.832 *	17137.6				136.317 *	79.1872 *	125.274
25-024-WR2-COMP		14853.4	32823.2	1076.9		1053.31 *	19875.4				861.762	181.153 *	217.181
25-024-WR3		18950.6	25137.1	693.598		1216.8 *	16988.4				257.222		113.191
25-024-WR4A		16175.2	10548.6	2970.09		2214.6	38183.2				192.795 *	250.61	465.716
25-024-WR4B		13681.1	36067.3	794.694		732.168 *	14470.1				212.974	107.253 *	171.592
25-024-WR4C		14003	61982	1486.65		2689.82	21479.3			115.739 *	381.758	114.417 *	232.367

XRF SAMPLE I.D.	Zr	Hg	Mo	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th
25-024-TP1	66.8021			80.4847 *	153.43				475.79			
25-024-TP1-COMP	101.737			41.4208 *	198.797							
25-024-TP2A1	81.2042			34.8399 *	139.978				499.814			
25-024-TP2A2	94.775			34.1952 *	198.748				812.778			
25-024-TP2A3	94.2635			106.889 *	207.366			133.673 *	498.209			
25-024-TP2A4	65.7137			94.6405 *	210.539			99.8384 *	363.633			15.6223 *
25-024-TP2A5	98.7921			53.8036 *	255.31			78.6551 *	588.547			12.5293 *
25-024-TP2A6	121.827				232.896			56.7124 *	618.203			
25-024-TP2A7	113.961			63.1393 *	238.274			64.6342 *	571.608			
25-024-TP2A8	184.617				131.177				485.538			14.6954 *
25-024-TP2B1	115.19			59.0419 *	190.284				682.539			
25-024-TP2B2	87.3366		8.67972 *		206.16				569.785			
25-024-TP2B3	84.8464			168.381	126.417			105.873 *	500.451			
25-024-TP2B4	79.5942			64.4612 *	178.328				544.828			
25-024-TP2C1	90.1986				162.545				573.369			
25-024-TP2C2	93.6751			50.2019 *	146.027			63.2404 *	396.68			
25-024-TP2C3	73.1089				127.665			53.3124 *	413.789			
25-024-TP2-COMP	76.6193			47.4554 *	145.311			59.844 *	463.252			
25-024-WR1	165.495				109.008				512.177			12.1527 *
25-024-WR1-COMP	139.004				103.979				337.741			
25-024-WR2	180.595				125.497				575.573			19.13 *
25-024-WR2-COMP	112.551		9.21755 *	48.1862 *	153.061				479.442			
25-024-WR3	120.413			138.632	189.314				332.328			
25-024-WR4A	141.031		8.14583 *		156.601				898.647			
25-024-WR4B	96.2956		7.71454 *	40.9349 *	164.342				396.245			
25-024-WR4C	165.502			144.691 *	158.358				716.339			14.489 *

* = Estimated Quantity

\$ = Unvalidated Data

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**DRUMLUMMON MINE/MILL/TAILINGS
PA NO. 25-024**

AIMSS SCORESHEET

SITE NAME: Drumlummon Mine/Mill/Tails
PA NUMBER: 25-024

LINE NO.		GROUNDWATER PATHWAY	
1		OBSERVED RELEASE	0
2		EXCEEDENCES	0
3A	GW - LIKELIHOOD OF RELEASE	CONTAINMENT	20
3B		GW DEPTH	20
3C		POTENTIAL TO RELEASE	400
4		LIKELIHOOD SCORE	400
5	GW - WASTE CHAR.	CALCULATED SCORE	11.024
6		(SEE WORKSHEET)	97.5
7	GW - TARGETS	WELLS - 1 MI. x 2.5	58
8		WELLS - 1 TO 4 MI	10
9		NEAREST WELL	165.5
10		TARGETS SCORE	729789
		GROUNDWATER SCORE	
		LINES 4 x 5 x 9	
		SURFACE WATER PATHWAY	
11		OBSERVED RELEASE	300
12		EXCEEDENCES	0
13A	SW - LIKELIHOOD OF RELEASE	CONTAINMENT	20
13B		DISTANCE TO SW	20
13C		POTENTIAL TO RELEASE	400
14		LIKELIHOOD SCORE	700
15	SW - WASTE CHAR.	CALCULATED SCORE	13.600
16		(SEE WORKSHEET)	0
17	SW - TARGETS	DRINKING WATER POP'N	3
18		IMPACTED DRAINAGE	10
19		WETLANDS	5
20		FISHERY	5
21		RECREATION	2
22		IRRIGATION/STOCK	0
23		T & E SPECIES HABITAT	25
24		TARGETS SCORE	238000
		SURFACE WATER SCORE	
		LINES 14 x 15 x 23	
		AIR PATHWAY	
25		OBSERVED RELEASE	0
26A	AIR - LIKELIHOOD OF RELEASE	CONTAINMENT	10
26B		DISTANCE TO POPULATION	20
26C		POTENTIAL TO RELEASE	200
27		LIKELIHOOD SCORE	200
28	AIR - WASTE CHAR.	CALCULATED SCORE	0.057
29		(SEE WORKSHEET)	100
30	AIR - TARGETS	POPULATION - 4 MILES	10
31		NEAREST RESIDENCE	10
32		WETLANDS	0
33		PARKS / WILDERNESS	0
34		T & E SPECIES HABITAT	0
35		TARGETS SCORE	120
		AIR PATHWAY SCORE	1368
		LINES 27 x 28 x 34	
		DIRECT CONTACT PATHWAY	
36		OBSERVED EXPOSURE	50
37A	LIKELIHOOD OF EXPOSURE	ACCESSIBILITY	20
37B		DISTANCE TO POPULATION	20
37C		POTENTIAL EXPOSURE	400
38		LIKELIHOOD SCORE	450
39	D. C. WASTE CHAR.	CALCULATED SCORE	0.046
40		(SEE WORKSHEET)	30
41	DIRECT CONTACT TARGETS	POPULATION - 1 MILE	10
42		NEAREST RESIDENCE	10
43		RECREATIONAL USE	10
44		TARGETS SCORE	50
		DIRECT CONTACT SCORE	1035
		LINES 38 x 39 x 43	
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE		
	(LINES 10 + 24 + 35 + 44) / 100,000		
			9.70

SITE NAME: Drumlummon Mine/Mill/Tails
 PA NUMBER: 25-024

LINE
NO.

SITE SAFETY

1	THREAT	ACCESSIBILITY		20
2		OPEN SHAFTS	100 EA.	400
3		OPEN ADITS	50 EA.	0
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	150
5		HAZ. STRUCTURES	40 EA.	40
6		EXPLOSIVES		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 THRU 7	590
9		POPULATION - 1 MILE		30
10	TARGETS	NEAREST RESIDENCE		10
11		RECREATIONAL USE		10
12		TARGETS SCORE	SUM LINES 9 THRU 11	50
13		SITE SAFETY SCORE	(LINES 1 x 8 x 12) / 1,000	590.00

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: DRUMLUMMON MINE, MILL, & TAILINGS PA#: 25-024

Date: June 23-24, 1994 Time: 0800-1600/0900-1400

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Belanger, Clark, West; Pioneer

Visitors: None

Weather/Seasonality Observations: Clear skies to partly sunny;
warm; occasional strong breeze.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #1: Highwall
associated with Adit and Pit #1 facing northeast; #3: Highwall
facing southwest at Pit #1 and adits; #4: WR-3, reclaimed; #5: Pit
#2 facing east (half of pit); #6: SW-1/SE-1 sample location on
Silver Creek above mine; #7: WR-3 and newer (stone) mill
foundation; #8: North end of WR-4; #9: Middle of WR-4; #10: South
end of WR-4 and wooden structure; #11: TP-1, revegetated; #12: Adit
discharge on WR-4, AD-1 sample location; #13: SW-2/SE-2 sample
location on Silver Creek after TP-1, but before TP-2; #14: SW-3/SE-
3 sample location on Silver Creek below tailings; #15: TP-2A
location in north blowout channel; #16: New beaver dam creating
pond on upper tailings, TP-2; #17: Silver Creek cut through dam,
south blowout; #18: TP-2 facing west; #19: TP-2 facing west-
northwest; #20: TP-2 facing northwest; #21: TP-2 facing north,
along dam (Note: North blowout); #22: TP-2B sample location; #23:
Erosion streamlet in tailings; #24: TP-2C sample location; #32:
Headframe, top of WR-1, and fenced shaft facing northeast; #33: Toe
of WR-1 and subsample location facing west; #34: Shaft #2 and
boiler and pulley at WR-2 facing south; #35: WR-2 and subsample
location facing west; #36, #37: Pit #1 and highwall facing
northeast; #38: Highwall and Pit #1. Video Tape No. 1

General Comments/Observations (not covered specifically in attached Inventory Forms):
Waste rock dumps on hillside are well vegetated; lower dumps are partially revegetated. TP-1 is completely revegetated. Partially functioning system to route adit discharge is in place. TP-2, large tailings 2 miles downstream, is actively eroding into Silver Creek.

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Create a channel for creek to bypass tailings at TP-2. TP-1 is revegetated and does not appear to represent a threat to surface water.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): DRUMLUMMON MINE, MILL, & TAILINGS PA#: 25-024

Legal Description:

MINE/MILL T 12N ; R 6W ; Sec. 36 , SE 1/4 1/4 1/4

T 11N ; R 6W ; Sec. 1 , NW 1/4 N 1/2 1/4

TAILINGS T 12N ; R 5W ; Sec. 34 , SE 1/4 S 1/2 1/4

T 11N ; R 5W ; Sec. 31 , NE 1/4 NE 1/4 1/4

County: LEWIS & CLARK Mining District: MARYSVILLE

MINE/MILL Latitude: N 46° 44' 36" Longitude: W 112° 17' 45"

TAILINGS Latitude: N 46° 44' 58" Longitude: W 112° 15' 28"

Primary Drainage Basin and Code: Silver Creek/10030101

Secondary Drainage Basin: Silver Creek

USGS Quadrangle map name(s): Greenhorn Mountain & Canyon Creek

Mine Type/Commodities: Hardrock/Copper, Gold, Silver, Lead, Zinc, Molybdenum

Activity Status: Active ☐ , Inactive/Exploration ☒ , Abandoned ☒ .

Ownership: Known Y ☐ N ☒ ; private/public? Private/Public

Owner, Agent, or Contact (Include address and phone when available): BLM

Relationship to other mines/sites in the area/district: Southeast of the Bald Mountain Mine (25-061) and the Belmont Mine (25-167).

Regulatory Status (Activity by other agencies)? Hardrock permits?

Past Reclamation Activities? WR-5 has been regraded and vegetated.

General site features: Elevation 5600'-6800', Slope 25°, Aspect Northwest

Land use: Mining ☐ , Recreational ☒ , Residential ☒ , Urban ☐ , Agricultural ☐ , Other(Specify)

Area of disturbed/unvegetated lands? 20 acre(s) .

Site Dimensions: Mines scattered over 1/2 mile; tailings 500'x200'

Predominant vegetation types: Ponderosa pine, juniper, Douglas fir, grasses, shrubs, willows on tailings ponds

Access: roads - good (paved) ☐ , poor (maintained dirt road) ☒ (To TP-1 and TP-2), 4wd ☒ (To Mines), trail ☐ .

Other logistical considerations (proximity to other sites). The mill lies on Ottawa Gulch Road less than 1/2 mile before reaching Marysville. The mine is on a 4wd road off of Ottawa Gulch Road.

Well logs within 1 mile radius; (Attach MEMG Well Log Printout(s): There are 39 wells reported within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). The Marysville district is situated on and around a small stock of quartz diorite intrusive into limestones and shales of the Belt series. Site lies in and above southeast side of Ottawa Gulch and Silver Creek. Silver Creek flows north-northeast away from the site and into Lake Helena 25 miles downgradient.

Mining/milling history, ore type/tenor, host rock, gangue: The Drumlummon is the oldest, most steadily operated, and the most productive property in the district. It was discovered in 1876 and worked intermittently through at least 1971. Tailings were retreated in 1896 and then some during 1970s. Fissure filling in quartz monzonite of small stock of Boulder batholith mineralization is disseminated pyrite, tetrahedrite, and free gold in quartz with limonite.

Mine Operation?

Shafts - Yes X, No , # 9, **Comment** Found 7; 9 were mapped
Adits - Yes X, No , # 4, **Comment** 1 discharging
Pits - Yes , No X, # , **Comment**
Placers - Yes , No X, # , **Comment**
Other - Yes , No X, # , **Comment**

Mill Operation? Yes X, No . If yes answer the next three questions:

Period(s) of Operation: First mill was erected in 1882; cyanide leach in 1896. Operated through at least 1928 and reopened in 1941; destroyed by fire in 1971.

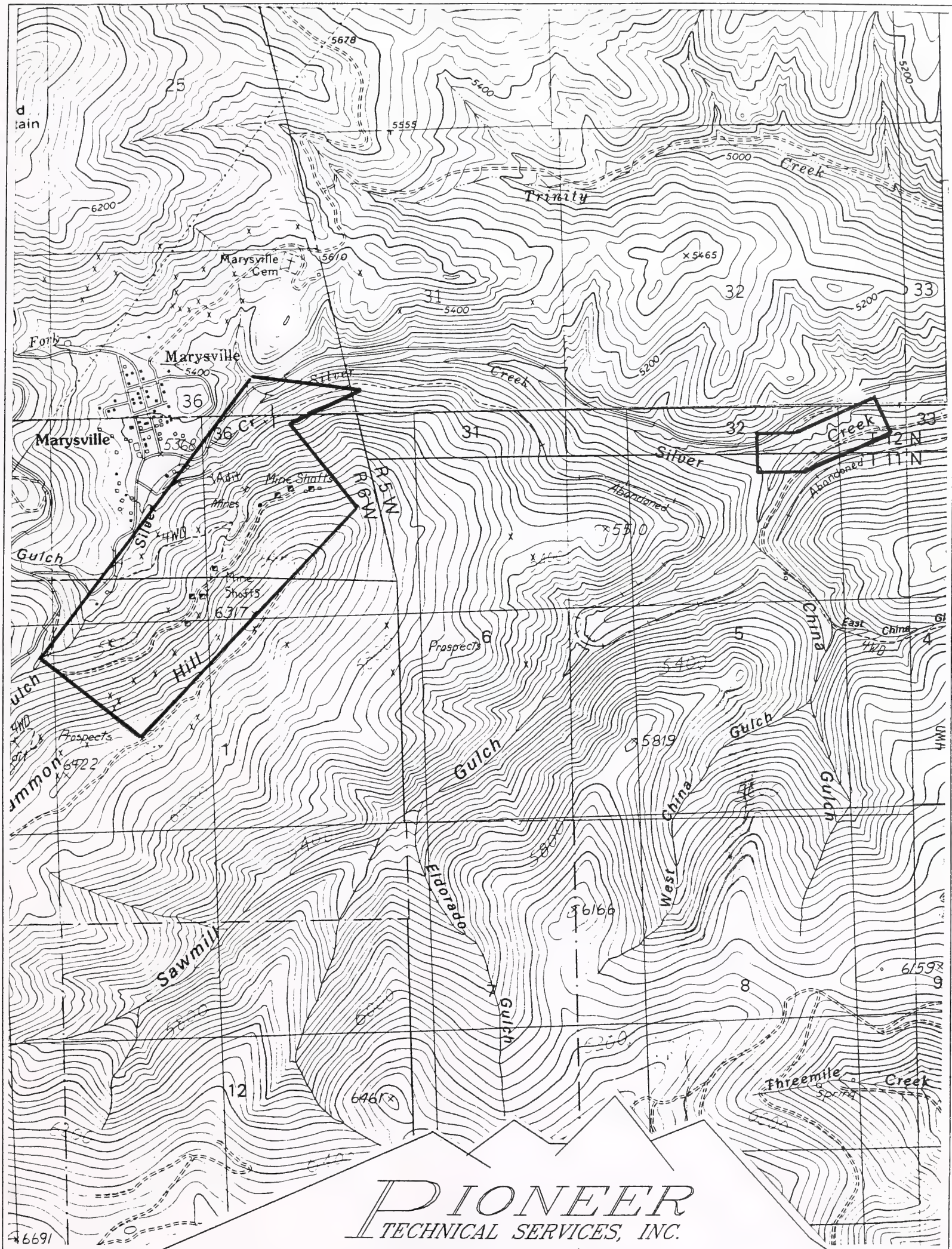
Origin of Ore Milled - Custom Mill X **Dedicated Mill** ; **Number and names of mines that supplied mill feed:** Ore came primarily from the Drumlummon mine, but possibly ore also came from the Belmont and Bald Mountain mines.

Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting? A 150-ton amalgamation-floatation mill was installed in 1942. A cyanide mill was also installed. In 1880, a 5 stamp mill was present. Around 1884, a 40-stamp mill was built where gold and silver ores were treated by salt roast and pan amalgamation. A second mill of 60-stamps was built in 1886 with plate amalgamation and frue vanners to recover sulfides. A 400-ton cyanide plant was constructed downstream in 1896 to retreat tailings, though amalgamation is reported through 1934. The 60-stamp mill was converted to a cyanide plant.

Montana Bureau of Mines and Geology
Water Well Log Data

08/11/1994

Well No.	Location	Depth	Yield	Static Water Level
M:66433	12N 06W 35	84.0	20.0	15.00
M:66434	12N 06W 35 ADB	120.0	15.0	20.00
M:66436	12N 06W 35 DDB	50.0	0.0	0.00
M:66435	12N 06W 35 DDB	50.0	1.0	27.00
M:66437	12N 06W 35 DDBC	0.0	60.0	75.00
M:140216	12N 06W 35 DDC	80.0	20.0	25.00
M:66438	12N 06W 36	52.0	38.0	25.00
M:66449	12N 06W 36	45.0	25.0	0.00
M:66443	12N 06W 36	0.0	0.0	0.00
M:66456	12N 06W 36	120.0	10.0	25.00
M:66452	12N 06W 36	25.0	0.0	20.00
M:66447	12N 06W 36	55.0	25.0	10.00
M:66446	12N 06W 36	155.0	3.0	8.00
M:66442	12N 06W 36	35.0	35.0	20.00
M:66444	12N 06W 36	55.0	30.0	5.00
M:66440	12N 06W 36	50.0	0.0	20.00
M:66448	12N 06W 36	32.0	30.0	8.00
M:66457	12N 06W 36	25.0	0.0	0.00
M:66453	12N 06W 36	50.0	20.0	15.00
M:66455	12N 06W 36	70.0	20.0	15.00
M:66439	12N 06W 36	0.0	20.0	0.00
M:66451	12N 06W 36	35.0	1.0	20.00
M:66450	12N 06W 36	12.0	0.0	0.00
M:66445	12N 06W 36	55.0	25.0	11.00
M:66441	12N 06W 36	35.0	35.0	20.00
M:66454	12N 06W 36	70.0	20.0	15.00
M:66458	12N 06W 36 A	25.0	0.0	0.00
M:66459	12N 06W 36 BACC	0.0	35.0	20.00
M:66460	12N 06W 36 BACC	25.0	35.0	20.00
M:138530	12N 06W 36 BBD	150.0	10.0	12.00
M:66461	12N 06W 36 BD	200.0	1.0	58.00
M:121418	12N 06W 36 BDB	110.0	6.0	0.00
M:66462	12N 06W 36 BDB	160.0	10.0	40.00
M:66464	12N 06W 36 BDC	60.0	20.0	15.00
M:66465	12N 06W 36 BDC	100.0	20.0	15.00
M:66463	12N 06W 36 BDC	86.0	15.0	30.00
M:127905	12N 06W 36 CA	80.0	20.0	25.00
M:66467	12N 06W 36 DB	105.0	20.0	63.00
M:66466	12N 06W 36 DB	105.0	10.0	46.00

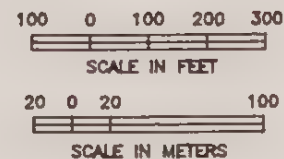


PIONEER
TECHNICAL SERVICES, INC.

DRUMLUMMON MINE/MILLSITE,

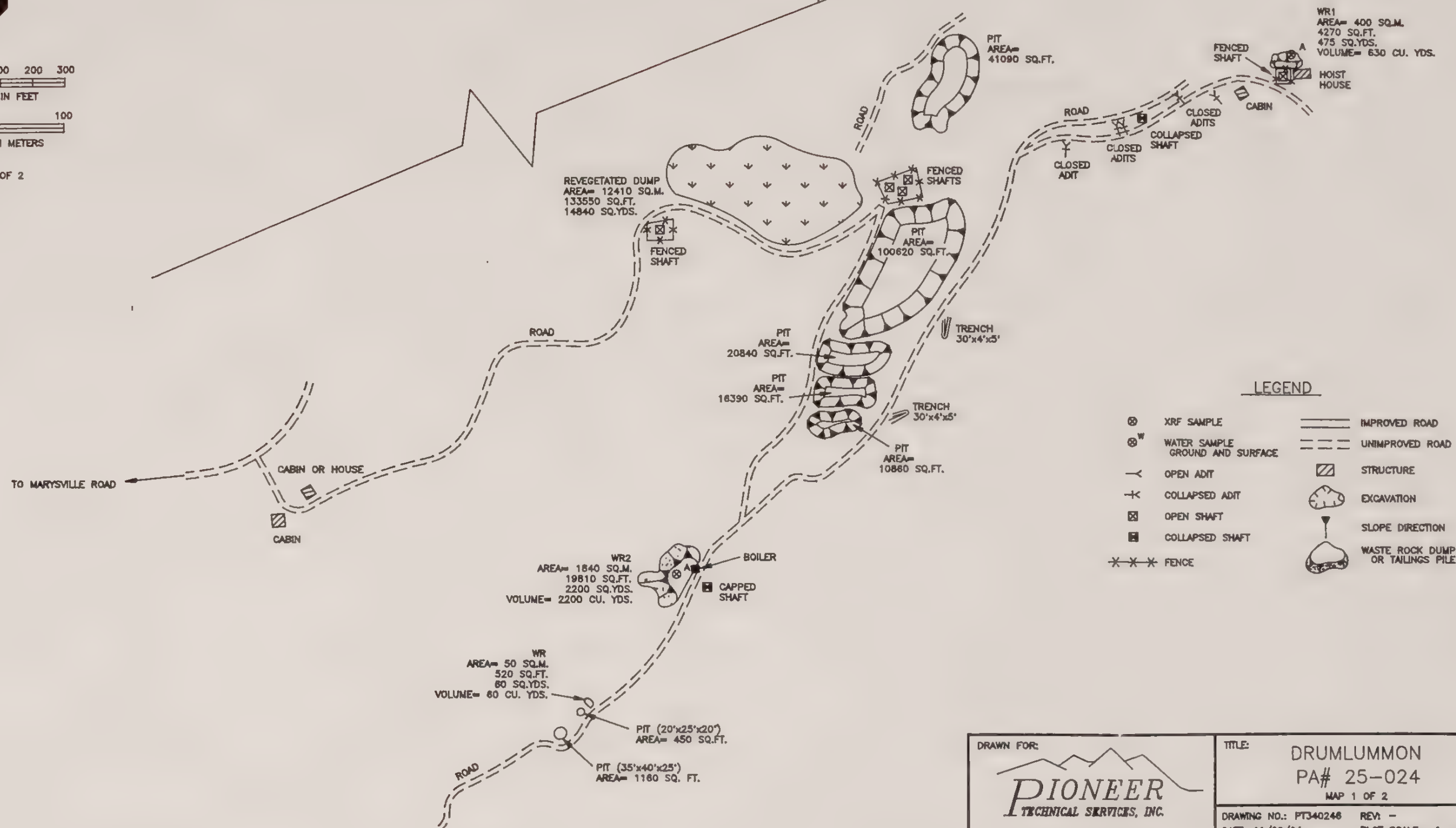
P.A. NO. 25-024
T12N, R06W, SECTION 36

SCALE: 1" = 2000'



MAP 1 OF 2

1/2 MILE
TO MILL SITE
SEE MAP 2 OF 2



DRAWN FOR:

PIONEER
TECHNICAL SERVICES, INC.

TITLE:

DRUMLUMMON
PA# 25-024
MAP 1 OF 2

DRAWING NO.: PT340248

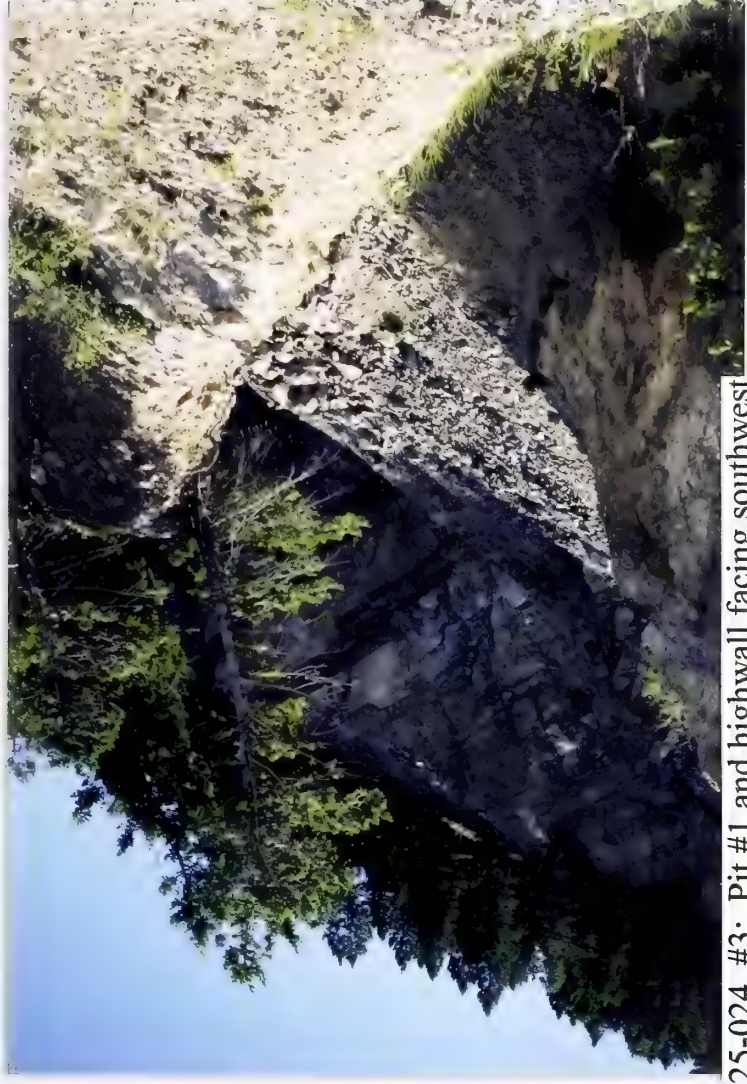
REV: -

DATE: 11/29/84

PLOT SCALE: 1 = 100



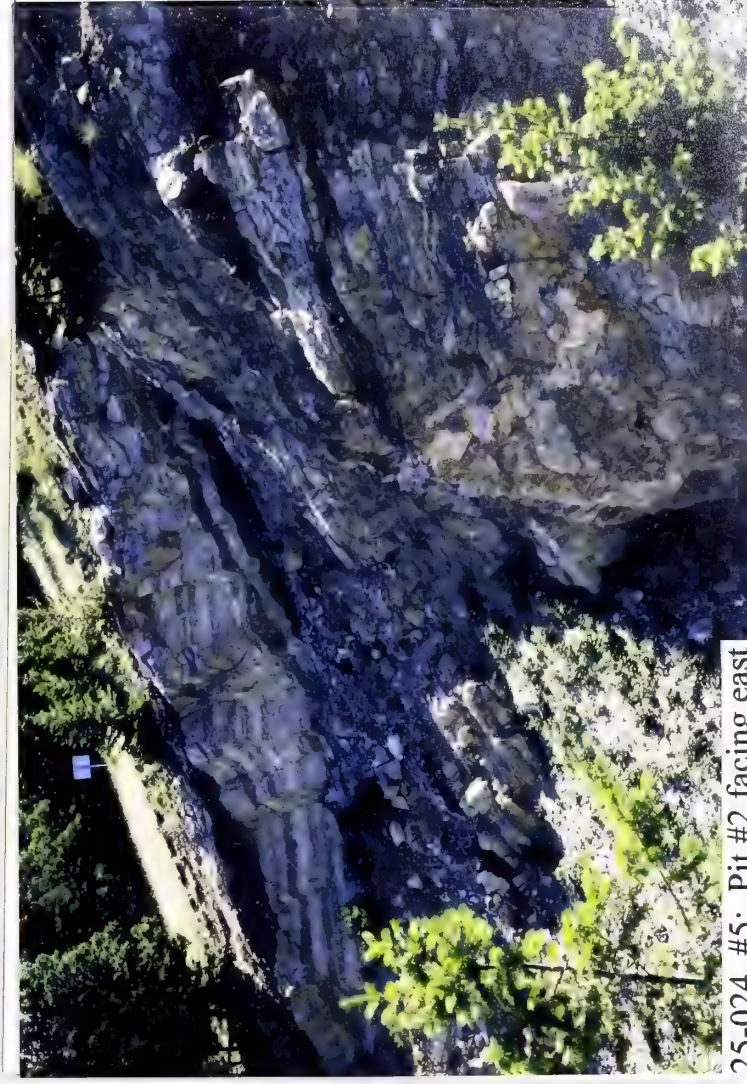
25-024, #1: Pit #1 and highwall facing northeast



25-024, #3: Pit #1 and highwall facing southwest



25-024, #4: WR-3 (reclaimed)



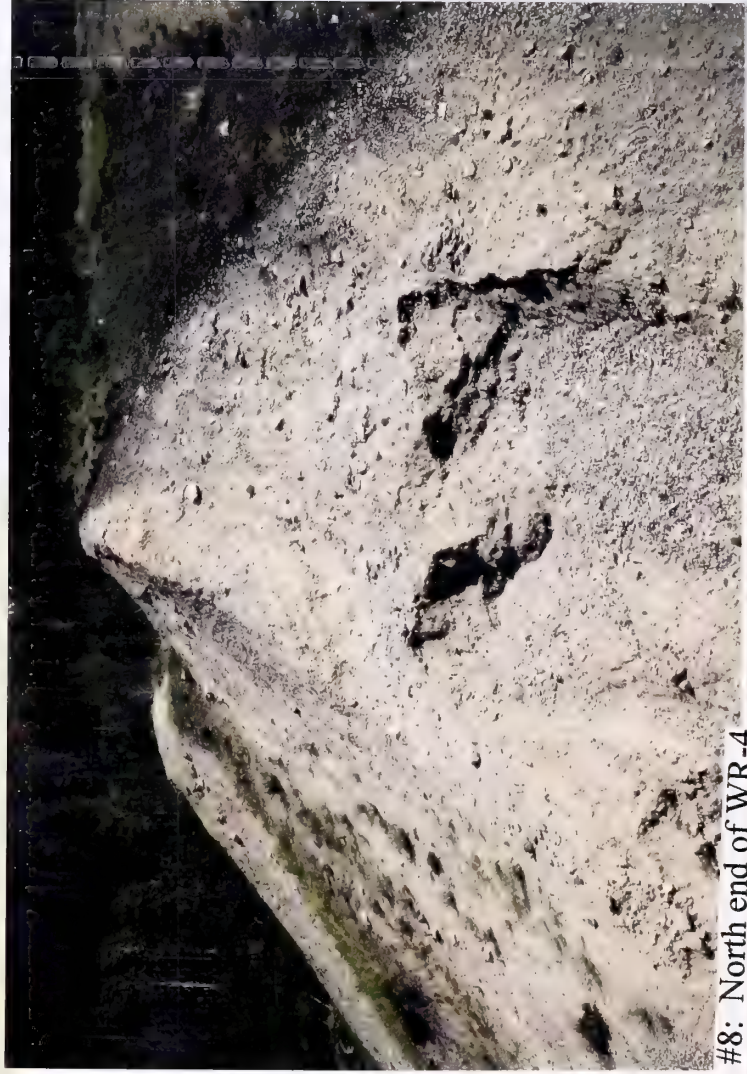
25-024, #5: Pit #2 facing east



25-024, #6: SW-1 and SE-1 sample location



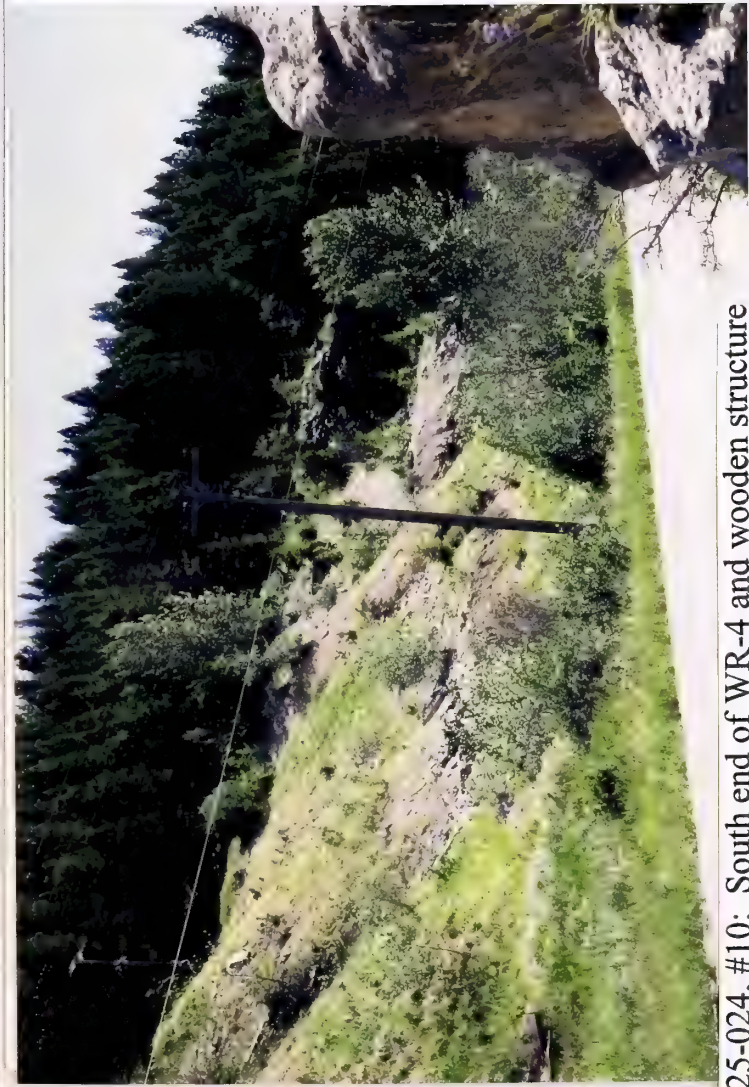
25-024, #7: WR-3 and newer (stone) mill foundation



25-024, #8: North end of WR-4



25-024, #9: Middle of WR-4



25-024, #10: South end of WR-4 and wooden structure



25-024, #11: TP-1 (revegetated)



25-024, #12: Adit #1 discharge on WR-4



25-024, #13: SW-2 and SE-2 sample location



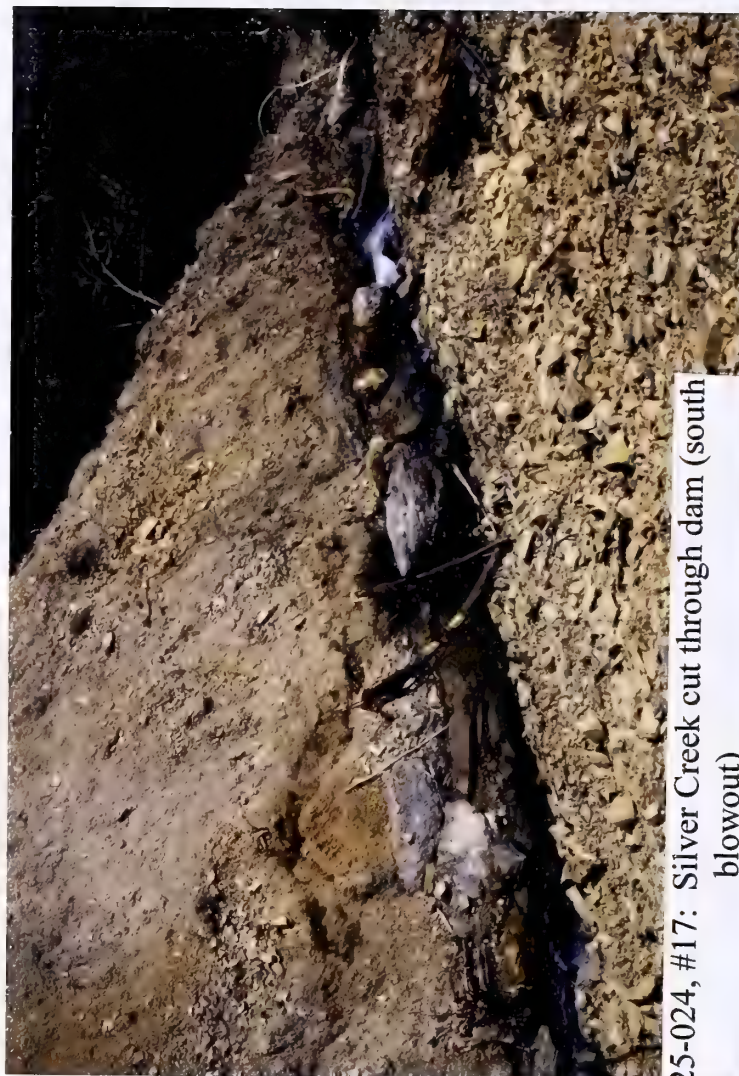
25-024, #14: SW-3 and SE-3 sample location



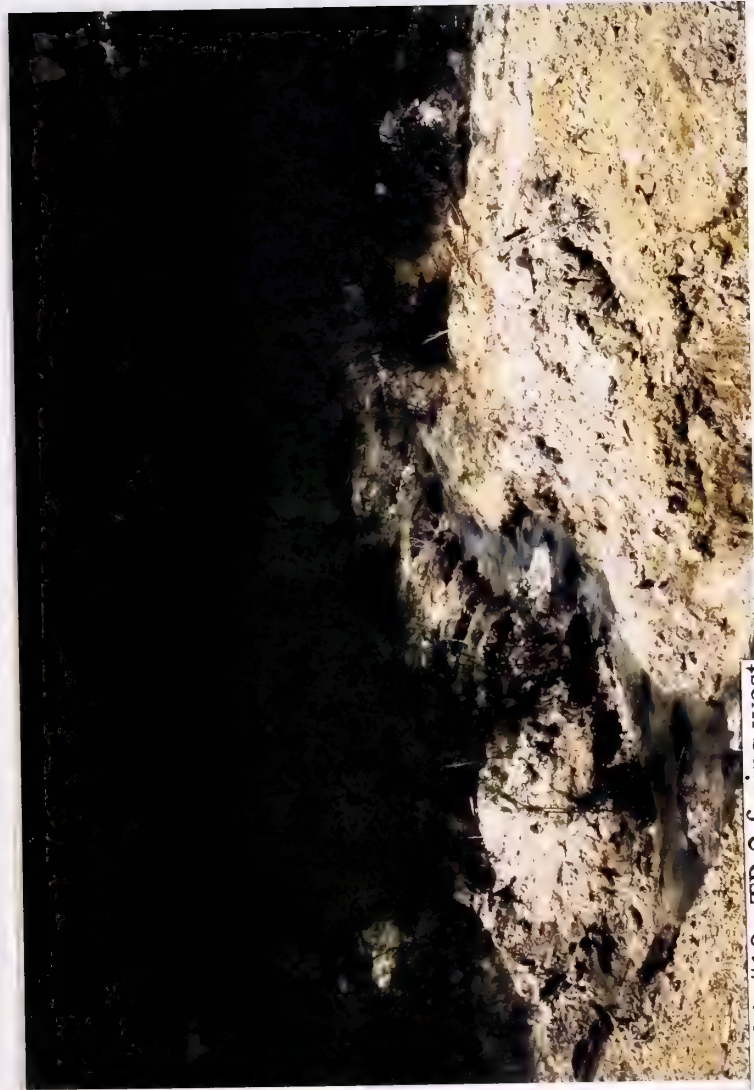
25-024, #16: New beaver dam creating pond on TP-2



25-024, #15: TP-2A sample location in north blowout channel



25-024, #17: Silver Creek cut through dam (south blowout)



25-024, #18: TP-2 facing west



25-024, #19: TP-2 facing west-northwest



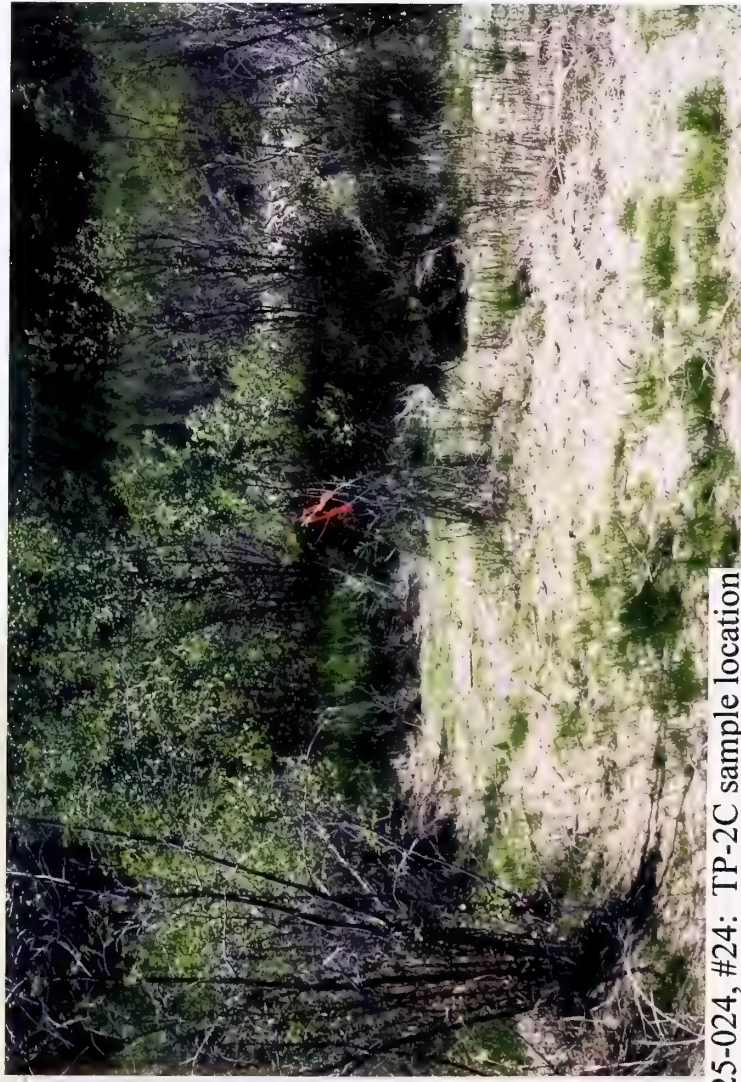
25-024, #20: TP-2 facing northwest



25-024, #21: TP-2 facing north (Note: Blowout)



25-024, #22: TP-2B sample location



25-024, #24: TP-2C sample location



25-024, #23: Erosion streamlet in tailings



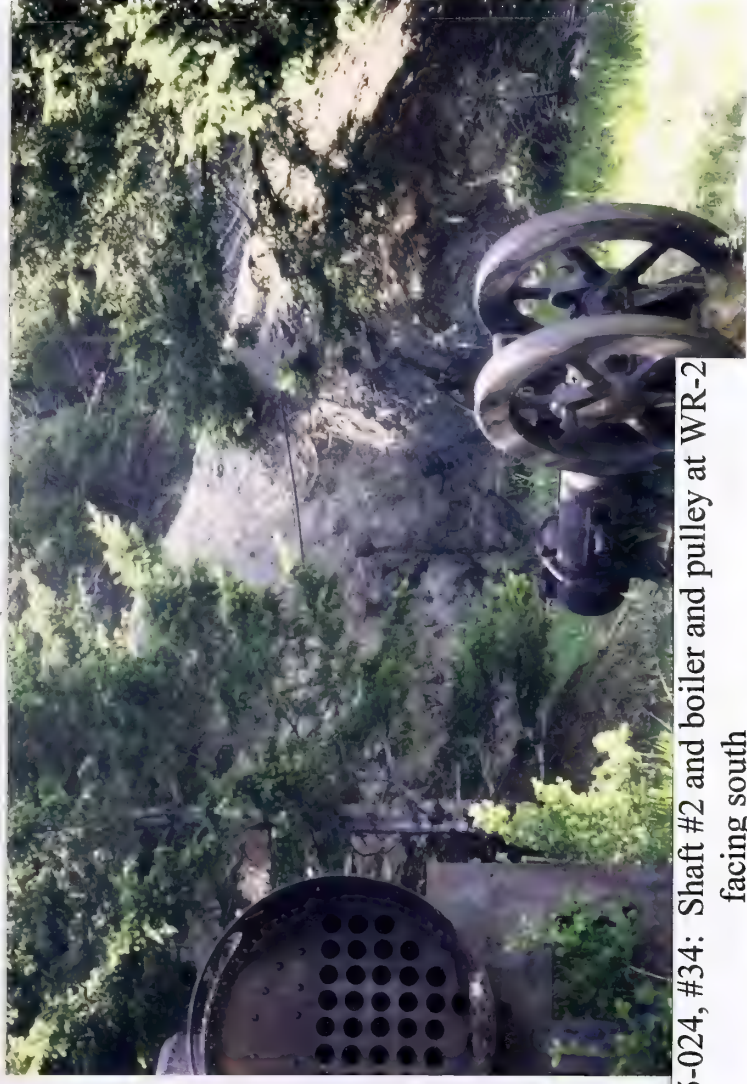
25-024, #32: Headframe, top of WR-1, and fenced shaft facing northeast



25-024, #33: Toe of WR-1 facing west



25-024, #35: WR-2 facing west



25-024, #34: Shaft #2 and boiler and pulley at WR-2 facing south



25-024, #36: Pit #1 and highwall facing northeast



25-024, #37: Pit #1 and highwall facing northeast



25-024, #38: Pit #1 and highwall

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: PEERLESS JENNY/KING PA#: 25-006

Date: July 26, 1994 Time: 1000-1340

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Clark, West; Pioneer

Visitors: None

Weather/Seasonality Observations: Warm; partly cloudy in the afternoon; dry, hot summer.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #10: Upper adit discharge at Peerless Jenny, AD-1 sample location; #11: Waste rock at adit discharge (WR-1D); #12: WR-1C, north dump lobe, from shaft; #13: WR-1B, gully between lobes, from shaft; #14: WR-1A, south dump lobe, from shaft; #15: Lower adit discharge at Peerless King, AD-2 sample location; #16: SW-3 sample location downstream of sites; #17: Lower seep at base of WR-2 (Note: Algae and FEOX); #18: View down drainage, fine waste rock with grass (Note: Dead trees); #19: WR-2, west dump; #20: West end of WR-2, east dump; #21: East end of WR-2, east dump. Video Tape No. 2

General Comments/Observations (not covered specifically in attached Inventory Forms): Large amount of sulfide-rich waste rock in drainage.

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Route discharge away from waste rock; isolate dumps from drainage, amend, and revegetate.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): PEERLESS JENNY/KING PA#: 25-006

Legal Description: T 8N ; R 5W ; Sec. 21 , SE 1/4 NW 1/4 1/4

County: LEWIS & CLARK Mining District: RIMINI

Latitude: N 46° 25' 54.7" Longitude: W 112° 14' 20.9"

Primary Drainage Basin and Code: Banner Creek/10030101

Secondary Drainage Basin: East Fork of Banner Creek

USGS Quadrangle map name(s): Chessman Reservoir

Mine Type/Commodities: Hardrock/Gold, Silver, Lead

Activity Status: Active , Inactive/Exploration , Abandoned X .

Ownership: Known Y N X ; private/public? Private

Owner, Agent, or Contact (Include address and phone when available): Unknown

Relationship to other mines/sites in the area/district: Site consists of the Peerless Jenny (25-006) and the Peerless King (25-263); adjacent to Queensbury.

Regulatory Status (Activity by other agencies)? Hardrock permits?
Past Reclamation Activities? N/A

General site features: Elevation 7320' , Slope 0-10° ,
Aspect North/Northeast

Land use: Mining X , Recreational X , Residential , Urban ,
Agricultural , Other (Specify)

Area of disturbed/unvegetated lands? 5 acre(s) .

Site Dimensions: 900 feet x 200 feet

Predominant vegetation types: Lodgepole pine/Douglas fir forest

Access: roads - good (paved) , poor (maintained dirt road) ,
4wd X , trail .

Other logistical considerations (proximity to other sites). The Queensbury is 1/4 mile east of this site; 4 miles south of Rimini; near the divide at the head of Tenmile Creek.

Well logs within 1 mile radius; (Attach MMS Well Log Printout(s): There are no wells reported within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). The principal country rock is quartz monzonite resembling the rock of the Boulder Batholith. A considerable body of aplite extends along the ridge from the Peerless Jenny to Red Mountain mine, where it is covered by Tertiary rhyolite. 0-500' unnamed tributary of East Fork Banner Creek; 500'-1 mile East Fork Banner Creek; 1-3 miles Banner Creek; 3-15 miles Tenmile Creek. High mountain valley alluvial system; fracture controlled; shallow groundwater.

Mining/milling history, ore type/tenor, host rock, gangue: The Peerless Group was discovered and began operations prior to 1873. Surface ores were initially extraordinarily rich - 50 tons averaged 900 oz. silver to the ton and 200 tons averaged nearly 500 oz. Between 1909 and 1947, 1,316 tons of ore were obtained. The mineralization occurs as a fissure filling in the quartz monzonite. Chiefly pyrite in quartz crushed host rock with argentiferous galena and sphalerite and cerrusite. The lode is a crushed zone in the granite.

Mine Operation?

Shafts - Yes X, No , # 2, Comment Caved
Adits - Yes X, No , # 2, Comment Both discharging
Pits - Yes , No X, # , Comment
Placers - Yes , No X, # , Comment
Other - Yes , No X, # , Comment

Mill Operation? Yes , No X. If yes answer the next three questions:

Period(s) of Operation: N/A

Origin of Ore Milled - Custom Mill Dedicated Mill ; Number and names of mines that supplied mill feed: N/A

Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting?
N/A

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): N/A

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): N/A

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): N/A

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): N/A

Comments on potential for mitigation: N/A

SOURCE INVENTORY FORM

SAMPLERS: Clark, West

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd ³)	LOCATION/DESCRIPTION	CONTAINMENT	PH SU (D/S)*	RADIO-ACTIVITY (mR/HR)	LAB. SAMPLE NO.	DATE/TIME	ANALYSES
WR-1A	WR	21,460	Upper dump associated with shaft; east	None	6.0 (D)	0.04	25-006-WR-1	07/26/94 1600	T-Metals, ABA
WR-1B	WR		Upper dump associated with shaft; gully, center	None	6.0 (D)	0.04			
WR-1C	WR		Upper dump associated with shaft; west	None	5.7 (D)	0.08			
WR-1D	WR		Upper dump associated with adit; far west	None	6.5 (D)	0.09			
WR-2A	WR	6,570	Lower area; west side of south dump	None	6.4 (D)	0.06	25-006-WR-2	07/26/94 1620	T-Metals, ABA
WR-2B	WR		Lower area; east side of south dump	None	5.4 (D)	0.09			
WR-2C	WR		Lower area; south side of north dump	None	4.9 (D)	0.07			
WR-2D	WR		Lower area; east side of north dump	None	6.4 (D)	0.045			
WR-2E	WR		Lower area; north side of north dump	None	< 3.5 (D)	0.06			
SS-1	SOIL	N/A	Background soil for area	N/A	N/A	N/A	25-006-SS-1	07/26/94 1700	T-Metals

*D-Direct Reading (Railway Meter); S-Saturated Paste (Orion Meter)

Comments or deviations from SOPs: 25-006-WR-1 is composite of WR-1A through -1D. 25-006-WR-2 is composite of WR-2A through -2E.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes X, No , Number: 2 Identification: AD-1, AD-2

Filled shafts: Yes , No X, Number: Identification:

Seeps/Springs: Yes X, No , Number: ? Identification: Numerous
seeps in close proximity to the mine

Groundwater wells within 4 miles?: Yes X, No ;

Number of well logs: 27

Distance to nearest well used for drinking:

 <1,000 ft; 1,000 ft to 0.5 miles; X >0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite , Probable , Possible X, Unlikely .

Large, uncontained source with abundant acid generating sulfides and
shallow groundwater.

Approximate Depth to Groundwater: X <25 ft; 25 - 100 ft; >100 ft.

Other observations/notes: There is a seep from the base of WR-2 with pH
of 4.35.

SAMPLERS: Tuesday

Flow: Estimated (E) or Measured (M) from adit, shaft, seep or springs?

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes ☒, No ☐, Name(s): West Fork of the East Fork of Banner Creek

Dry streambeds: Yes ☒, No ☐, Name(s): West Fork of the East Fork of Banner Creek above Peerless mines

Other surface water: Yes ☒, No ☐, Name(s)/Description: Two adit discharges

Waste materials within any floodplain: Yes ☒, No ☐ Source ID(s): WR-2

Approximate Flood frequency? ☒ 1 yr, ☐ 10 yr, ☐ 100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? 5 gpm
High Flow: 0.2 cfs, Average Flow: 10 gpm

Distance between waste source(s) and nearest surface water body (ft)? 0 feet; WR-2 is in surface water.

Surface water draining onto or through waste sources: Yes ☒, No ☐, Describe: Both adits discharge onto and through dumps.

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Banner Creek is a tributary to Tenmile Creek which is a drinking water supply to the city of Helena; wetlands present and fishery in Banner and Tenmile Creeks.

Observed erosional/sedimentation/stream turbidity problems? Yes ☒, No ☐. Distance downstream (ft)? 0-500 ☐; 500-1,000 ☒; >1,000 ☐.
Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): Dump material in drainage 500 feet down from lower dumps.

SURFACE WATER INVENTORY FORM

SAMPLERS: Tuesday

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SAMPLE LOCATION	pH	SC $\mu\text{S}/\text{cm}$ @ 25°C	Temp °C	ALK. mg/L as CaCO_3	Flow' cfs/gpm	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
SE-1	SE	Upstream of WR-1 in dry drainage	N/A	N/A	N/A	N/A	N/A	25-006-SE-1	07/26/94 1100	T-Metals
SW-2	SW	Downstream of WR-1 in drainage, upstream of WR-2	NM	NM	NM	NM	1 gpm (E)	25-006-SW-2	07/26/94 1100	T-Metals, TDS, Hardness, Cl, SO ₄ , NO ₂ /NO ₃
SE-2	SE	Downstream of WR-1 in drainage, upstream of WR-2	N/A	N/A	N/A	N/A	N/A	25-006-SE-2	07/26/94 1100	T-Metals
SW-3	SW	Downstream of WR-2 in drainage	7.84	210	19.0	12	10 gpm (E)	25-006-SW-3	07/28/94 1240	T-Metals, TDS, Hardness, Cl, SO ₄ , NO ₂ /NO ₃
SE-3	SE	Downstream of WR-2 in drainage	N/A	N/A	N/A	N/A	N/A	25-006-SE-3	07/26/94 1240	T-Metals
SW-4	SW	East Fork Banner Creek after confluence with Queensbury drainage	7.76	123	17.2	NM	30 gpm (E)	25-262-SW-4	07/26/94 1700	T-Metals, TDS, Hardness, Cl, SO ₄ , NO ₂ /NO ₃
SE-4	SE	East Fork Banner Creek after confluence with Queensbury drainage	N/A	N/A	N/A	N/A	N/A	25-262-SE-4	07/26/94 1700	T-Metals

Flow: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): NM = Not Measured

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO₃)
Presence of evaporative salt deposits? (ESD)
Discolored or turbid seepage? (SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?
Presence of ferric hydroxide precipitates? (FEOX)
Presence of burned or stressed vegetation? (VEG)
pH ≤ 5.0 (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? < 1 acre; most of valley taken by dumps.

Wetlands present: Yes X, No , Describe: Wetlands present below WR-2.

Carbonate rocks/soils: Yes , No X, Describe:

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10 ; 10-30 X; 30-100 ;
100-300 ; 300-1,000 ; 1,000-3,000 ; 3,000-10,000 ; 10,000 or
greater ; Comments

Nearest residence: < 1,000 ft; 1,000 ft - 0.5 miles; X > 0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
 observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Tuesday, Clark, West

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (TSS/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH/MODERATE/LOW/NONE)
WR-1	SO3; FEOX	Dry	96,580	96,580	Yes	Moderate
WR-2	SO3; FEOX; pH	Dry	20,710	14,500	Yes	Moderate
AD-1	FEOX	Wet	N/A	N/A	N/A	N/A
AD-2	FEOX; Algae	Wet	N/A	N/A	N/A	N/A

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X,
Describe: _____

Population within 1 mile: 1-10 X; 10-30____; 30-100____; 100-300____;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____;
Comments _____

Evidence of recreational use on site: Yes X, No____, Describe: Litter;
campfire rings

Accessibility (check each that apply): X Easily accessible - no fences,
gates, or warning signs;____ Moderately Accessible - barbed wire fences,
road gated, or signs posted;____ Difficult Access - chain-link fence,
road gated and locked, site guarded (does not include locked or manned
access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment _____
Wilderness Area - Yes____, No X, Comment _____
T&E Species Habitat - Yes____, No X, Comment _____
Bat Habitat - Yes____, No X, Comment _____

Primary Drainage____; Secondary Drainage____; No Information X :

Riparian Habitat Quality - High____, Medium____, Low____

Wetlands Frontage - High____, Medium____, Low____

Fisheries Habitat and Species Classification - ____

Sport Fishery Classification - ____

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes____, No X, Number____, types and locations:____

Hazardous structures: Yes X, No____, Number 2, types and locations:____
Large cabin/bunk houses

Unstable highwalls, pits, trenches, slopes: Yes____, No X, Number____,
types and locations:____

Unstable waste piles, impoundments, undercut banks: Yes____, No X,
Number____, types and locations:____

Fire and/or Explosion hazards: Yes____, No X, Explain:____

Bibliography

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0, Prepared by Montana Natural Resource Information System, December 1989.

MDSL/AMRB Files, Abandoned Mine Reclamation Inventory Field Forms for Peerless Jenny and Peerless King, Prepared by Robert Peccia & Associates, July 21, 1988.

USGS, Geology and Mineral Deposits of the Jefferson City Quadrangle, Jefferson and Lewis and Clark Counties, Montana, Professional Paper 428, Author Unknown, Date Unknown.

USGS, Greater Helena Mining Region, Montana, Bulletin 842, Author Unknown, Date Unknown, p. 258.

USGS, Ore Deposits of Helena Mining Region, Montana, Bulletin 527, Author, Unknown, Date Unknown, p. 84.

USGS, Topographic Map, Chessman Reservoir, Montana, 7 1/2 minute Quadrangle, 1985.

LABORATORY ANALYTICAL DATA

**PEERLESS JENNY/KING
PA NO. 25-006**

Peerless Jenny/King PA# 25-006
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - TUESDAY
INVESTIGATION DATE: 07/26/94

SOLID MATRIX ANALYSES

Metals in soils Results per dry weight basis

FIELD ID	Ag (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
25-006-SE1	2.1	21.6	101	0.8	5.2	4.0	33.0	19700	0.03 UJX	536	3.7	48.6 J	9.4 UJ	52.4	NR
25-006-SE2	13.9	23.0	29.6	0.9	2.9	2.0	112	10100	0.03 UJX	693	3.0 U	401 J	10.9 UJ	209	NR
25-006-SE3	22.3 JX	32.2 J	62.0	5.1	6.2	1.6 U	310	15300	0.03	1240	3.5 U	544	12.4 UJ	528	NR
25-006-WR1	44.7 JX	91.3 J	26.1	1.5	2.0	1.1 U	291	21800	0.18	458	2.3 U	1150	8.2 UJ	302	NR
25-006-WR2	25.2 JX	65.2 J	93.3	8.4	5.8	1.4 U	103	18800	0.84	689	5.7	431	10.8 UJ	1050	NR
25-262-SE4	1 U	7.8 U	35	1.1	3.6	2.0	25.8	3870	0.03 JX	934	3.4 U	23.9 J	12.0 UJ	191	NR
BACKGROUND	0.8 UJX	18.9 J	117	3.5	5.1	1.9	13.5	8300	0.03	1480	4.5	93.2	9.4 UJ	130	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		TOTAL ACID BASE		SULFUR POTENT.		SULFATE SULFUR		PYRITIC SULFUR		ORGANIC SULFUR		PYRITIC ACID BASE		SULFUR ACID BASE	
	%	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t
25-006-WR1	0.17	5.31		-0.89	-6.2		0.15		0.01		0.01		0.31		-1.21	
25-006-WR2	0.34	10.6		1.51	-9.1		0.25		<0.01		0.09		0.00		1.51	

WATER MATRIX ANALYSES

Metals in Water Results in ug/L

FIELD ID	Ag	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
25-006-AD1	0.55	3.0	27.7	4.0 UJX	8.4 U	6.8 U	5.9 U	33.2	0.08 U	3.1	14.4 U	3.2 J	51.6 U	15.6 U	18.9 B
25-006-AD2	0.22	4.9	26.6	10.4 JX	8.4 U	6.8 U	104	1090	0.08 U	4810	14.4 U	11.7 J	51.6 U	1230 J	129
25-006-SW2	1.85	1.9	37.7	33.1 JX	8.4 U	6.8 U	349	61.2	0.08 U	3540	14.4 U	47.1 J	51.6 U	3510 J	26.4 B
25-006-SW3	0.30	3.8	27.5	4.2 JX	8.4 U	6.8 U	19.6	38.3	0.08 U	680	14.4 U	3.3 J	51.6 U	867 J	88.0
25-262-SW4	0.13	3.2	25.9	4.0 UJX	8.4 U	6.8 U	5.9 U	268	0.08 U	351	14.4 U	3.8 J	51.6 U	164 J	47.4

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Wet Chemistry Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
25-006-AD1	46	<5	9.0	0.06	NR
25-006-AD2	181	<5	99	0.06	NR
25-006-SW2	99	<5	40	0.06	NR
25-006-SW3	133	<5	71	0.06	NR
25-262-SW4	84	<5	31	0.06	NR

LEGEND

SE1 - Upstream of WR1 in dry drainage.
SE2 - Downstream of WR1 in drainage; upstream of WR2.
SE3 - Downstream of WR2 in drainage.
25-262-SE4 - From the Queensbury/Peerless King Mine; below Peerless drainage.
WR1 - Composite of subsamples WR1A through ID.
WR2 - Composite of subsamples WR2A through 2E.
BACKGROUND - From the Peerless Jenny/King Mine (25-006-SE1).

AD1 - Upper adit at the Peerless Jenny.
AD2 - Lower adit at the Peerless Jenny.
SW2 - Same as sample 25-006-SE2.
SW3 - Same as sample 25-006-SE2.
25-262-SW4 - Same as sample 25-262-SE4.

XRF ANALYSIS RESULTS

**PEERLESS JENNY/KING
PA NO. 25-006**

Mine Name: Peerless Jenny/King PA# 25-006
XRF Field Analyses
Results in PPM

XRF SAMPLE I.D.	CrHI	K	Ca	Ti	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Sr
25-006-WR1A		36755.6	1719.24	789.977		1024.64 *	20613.9			308.692 *	126.374 *		72.27
25-006-WR1B		31717.8	3689.26	888.729		856.725 *	36952.9				604.435		60.6477 *
25-006-WR1C	464.509 *	33328.3	1483.72	1177.29			28753.7				323.457		25.6896 *
25-006-WR1D	482.335 *	24226.8	1640.72	453.049 *			39110.2			478.973	169.615 *		19.5204 *
25-006-WR1D-DUP		25136.9	1747.19	480.5 *		629.271 *	39575.5			492.726	158.642 *		15.7664 *
25-006-WR1-COMP		31303.3	1522.17	832.384	204.771 *	828.277 *	31035.2			312.668 *	282.785		35.0962 *
25-006-WR2A		40262.7	3363.56	657.612 *		1121.9 *	12638.6				114.659 *		64.8007
25-006-WR2B		28514	2833.85	1156.62			34069.9			113.118 *	175.321 *		158.492
25-006-WR2C		32318.3	8555.16	771.007 *			37868.8			90.6133 *	123.351 *		53.0641
25-006-WR2D	583.988 *	23060.7	8187.17	2178.11		1053.53 *	27988.3				180.357 *		384.423
25-006-WR2E		32524.6	4618.87	1442.76		2181.51 *	32408.1				2064.59		101.116
25-006-WR2-COMP		28577.9	4545.56	1266.8		1113.59 *	29468.5			93.3505 *	367.754		171.018

XRF SAMPLE I.D.	Zr	Hg	Mo	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th
25-006-WR1A	110.952			404.763	261.499				376.9			14.6245 *
25-006-WR1B	139.621			1840.3	217.754				371.639			
25-006-WR1C	139.942		9.6214 *	271.122	243.622				257.676			17.1795 *
25-006-WR1D	70.9644		27.5926 *	1539.05	179.508			65.2927 *	161.757	159.84 *		
25-006-WR1D-DUP	72.9076		34.2942	1526.25	188.397			60.5282 *	141.329	191.516 *	20.5692 *	19.8319 *
25-006-WR1-COMP	106.745		17.2912 *	1182.64	216.994				259.569		26.3511 *	
25-006-WR2A	110.402			36.879 *	249.558				423.546			15.0053 *
25-006-WR2B	141.975			763.717	219.649				487.163			
25-006-WR2C	160.171			398.93	203.007				406.782			
25-006-WR2D	153.073			54.5467 *	148.347				814.624			13.9208 *
25-006-WR2E	155.36		9.81273 *	594.415	245.648			55.5963 *	462.559			
25-006-WR2-COMP	164.998			395.491	202.677				501.809			

* = Estimated Quantity

\$ = Unvalidated Data

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**PEERLESS JENNY
PA NO. 25-006**

AIMSS SCORESHEET

SITE NAME: Peerless Jenny/King
PA NUMBER: 25-006

LINE NO.		GROUNDWATER PATHWAY	
1		OBSERVED RELEASE	0
2		EXCEEDENCES	0
3A	GW - LIKELIHOOD OF RELEASE	CONTAINMENT	20
3B		GW DEPTH	20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
6		WELLS - 1 MI. x 2.5	0.0
7	GW - TARGETS	WELLS - 1 TO 4 MI	27
8		NEAREST WELL	0
9		TARGETS SCORE	LINES 6 + 7 + 8
10		GROUNDWATER SCORE	LINES 4 x 5 x 9
			147312
		<u>SURFACE WATER PATHWAY</u>	
11		OBSERVED RELEASE	0
12	SW - LIKELIHOOD OF RELEASE	EXCEEDENCES	50
13A		CONTAINMENT	20
13B		DISTANCE TO SW	20
13C		POTENTIAL TO RELEASE	LINES 13A x 13B
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
16		DRINKING WATER POP'N	2450
17	SW - TARGETS	IMPACTED DRAINAGE	1
18		WETLANDS	10
19		FISHERY	0
20		RECREATION	5
21		IRRIGATION/STOCK	2
22		T & E SPECIES HABITAT	0
23		TARGETS SCORE	SUM LINES 16 THRU 22
24		SURFACE WATER SCORE	LINES 14 x 15 x 23
			17378669
		<u>AIR PATHWAY</u>	
25		OBSERVED RELEASE	0
26A	AIR - LIKELIHOOD OF RELEASE	CONTAINMENT	10
26B		DISTANCE TO POPULATION	5
26C		POTENTIAL TO RELEASE	LINES 26A x 26B
27		LIKELIHOOD SCORE	LINES 25 + 26C
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
29		POPULATION - 4 MILES	10
30	AIR - TARGETS	NEAREST RESIDENCE	0
31		WETLANDS	0
32		PARKS / WILDERNESS	0
33		T & E SPECIES HABITAT	0
34		TARGETS SCORE	SUM LINES 29 THRU 33
35		AIR PATHWAY SCORE	LINES 27 x 28 x 34
			88
		<u>DIRECT CONTACT PATHWAY</u>	
36		OBSERVED EXPOSURE	50
37A	LIKELIHOOD OF EXPOSURE	ACCESSIBILITY	20
37B		DISTANCE TO POPULATION	5
37C		POTENTIAL EXPOSURE	LINES 37A x 37B
38		LIKELIHOOD SCORE	LINES 36 + 37C
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE	1
41		NEAREST RESIDENCE	0
42		RECREATIONAL USE	10
43		TARGETS SCORE	SUM LINES 40 THRU 42
44		DIRECT CONTACT SCORE	LINES 38 x 39 x 43
			251
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE (LINES 10 + 24 + 35 + 44) / 100,000		175.26

SITE NAME: Peerless Jenny/King
 PA NUMBER: 25-006

LINE NO.	SITE SAFETY			
1	THREAT	ACCESSIBILITY		20
2		OPEN SHAFTS	100 EA.	0
3		OPEN ADITS	50 EA.	0
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	0
5		HAZ. STRUCTURES	40 EA.	80
6		EXPLOSIVES		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 THRU 7	80
9		POPULATION - 1 MILE		1
10	TARGETS	NEAREST RESIDENCE		0
11		RECREATIONAL USE		10
12		TARGETS SCORE	SUM LINES 9 THRU 11	11
13		SITE SAFETY SCORE	(LINES 1 x 8 x 12) / 1,000	17.60



25-006, #10: Upper adit discharge at Peerless Jenny



25-006, #11: Waste rock at adit discharge



25-006, #12: WR-1C, north dump lobe from shaft



25-006, #13: WR-1B, gully between lobes from shaft



up lobe from shaft



25-006, #15: Lower adit discharge at Peerless Jenny



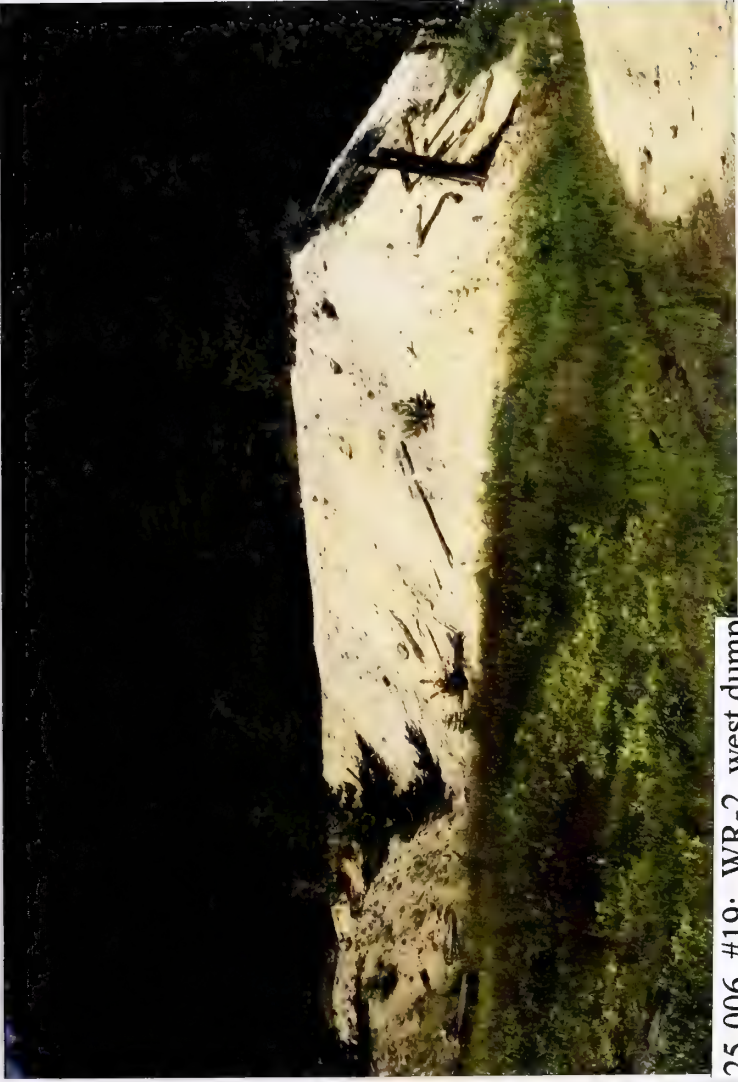
25-006, #16: SW-3 sample location



25-006, #17: Lower seep at base of WR-2 (Note: Algae and FEOX)



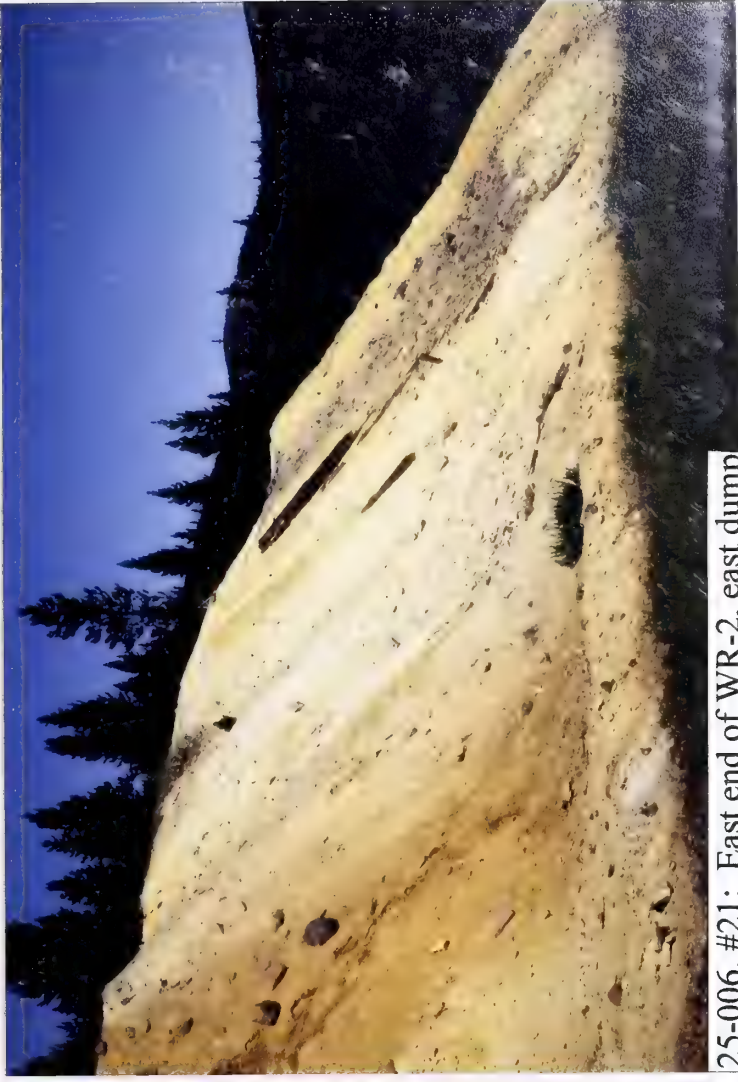
25-006, #18: View down drainage; fine waste rock with grass (Note: Dead trees)



25-006, #19: WR-2, west dump



25-006, #20: West end of WR-2, east dump



25-006, #21: East end of WR-2, east dump

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: WOODROW WILSON PA#: 25-258

Date: July 28, 1994 Time: 1130-1530

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Clark, West; Pioneer

Visitors: None

Weather/Seasonality Observations: Partly cloudy; warm; dry, hot summer.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #24: Adit discharge, AD-1 sample location; #25: West Fork of West Fork of Banner Creek flowing through ore bin and part of WR-1. Video Tape No. 2

General Comments/Observations (not covered specifically in attached Inventory Forms): Some reclamation attempted (contouring of dumps and settling pond).

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Partly reclaimed - need revegetation and rerouting of the adit discharge around dump. Also, the West Fork of Banner Creek channel needs to be rerouted around dump.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): WOODROW WILSON PA#: 25-258

Legal Description: T 8N ; R 5W ; Sec. 20 , SW 1/4 SW 1/4 SW 1/4

County: LEWIS & CLARK Mining District: RIMINI

Latitude: N 46° 24' 51" Longitude: W 112° 15' 22"

Primary Drainage Basin and Code: Banner Creek/10030101

Secondary Drainage Basin: West Fork Banner Creek

USGS Quadrangle map name(s): Three Brothers

Mine Type/Commodities: Hardrock/Gold, Silver

Activity Status: Active , Inactive/Exploration , Abandoned X .

Ownership: Known Y N X ; private/public? Private

Owner, Agent, or Contact (Include address and phone when available): Unknown

Relationship to other mines/sites in the area/district: Numerous mine sites in the area. Peter mine, 1/4 mile northeast, is likely on the same vein.

Regulatory Status (Activity by other agencies)? Hardrock permits?
Past Reclamation Activities? N/A

General site features: Elevation 7600'-7700', Slope 10°-15°,
Aspect Northeastern

Land use: Mining , Recreational X, Residential , Urban ,
Agricultural , Other (Specify)

Area of disturbed/unvegetated lands? 1 acre(s) .

Site Dimensions: 300 feet x 100 feet

Predominant vegetation types: Engelmann spruce, alder, Lodgepole pine

Access: roads - good (paved) , poor (maintained dirt road) ,
4wd X, trail .

Other logistical considerations (proximity to other sites).
Southwest and upstream from the Peter mine.

Well logs within 1 mile radius; (Attach MBMG Well Log Printout(s): There are no wells reported within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). Site lies on the west side of the West Fork of Banner Creek. The West Fork flows into Banner Creek approximately 2.5 miles north. Banner Creek continues flowing north to confluence with Tenmile Creek 2 miles away.

Mining/milling history, ore type/tenor, host rock, gangue: No information available.

Mine Operation?

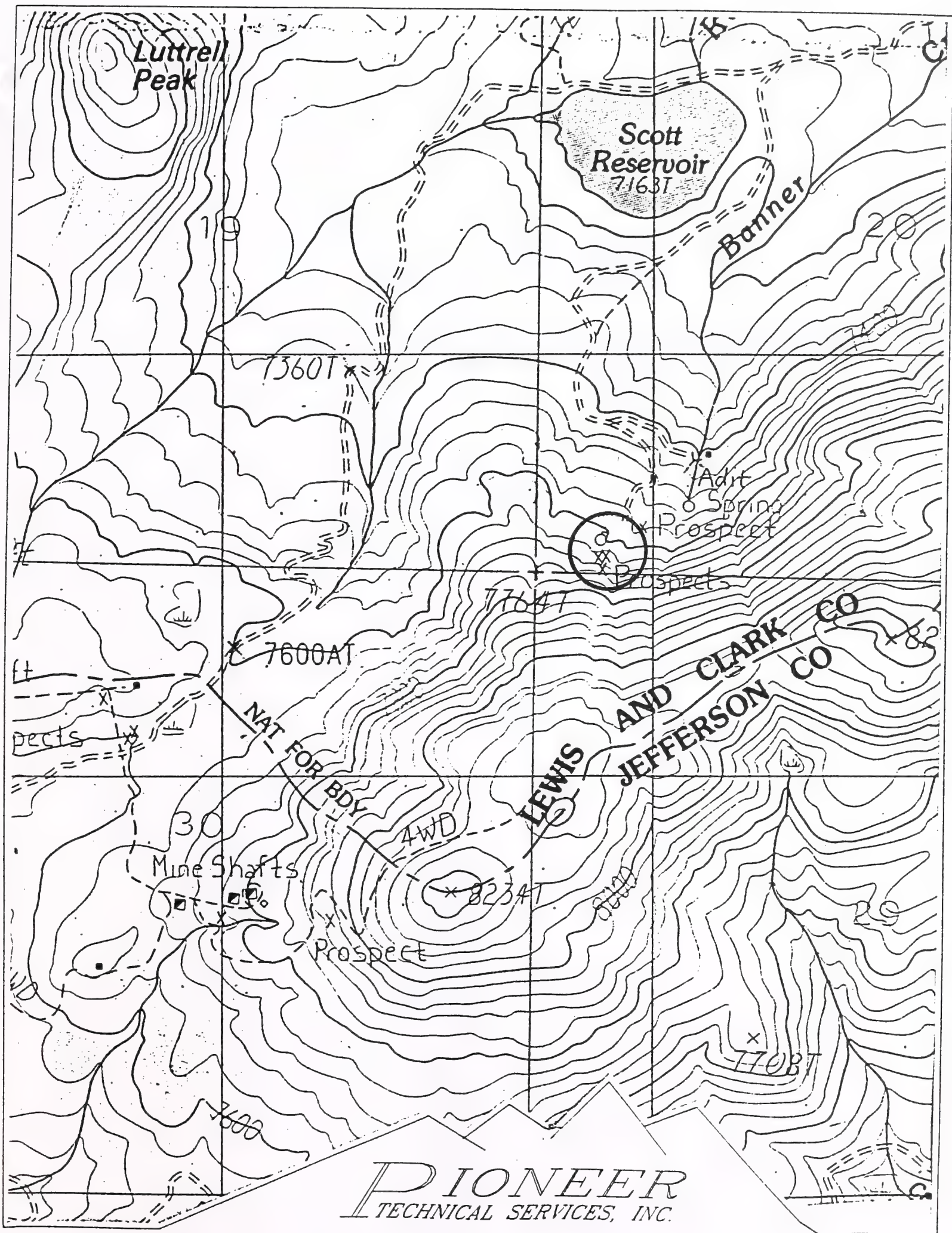
Shafts - Yes , No X, # , Comment
Adits - Yes X, No , # 1, Comment Caved; discharging
Pits - Yes , No X, # , Comment
Placers - Yes , No X, # , Comment
Other - Yes , No X, # , Comment

Mill Operation? Yes , No X. If yes answer the next three questions:

Period(s) of Operation: N/A

Origin of Ore Milled - Custom Mill Dedicated Mill ; Number and names of mines that supplied mill feed: N/A

Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting?
N/A



WOODROW WILSON, P.A. NO. 25-258
 T08N, R05W, SECTION 20
 SCALE: 1" = 1000'



LEGEND

⊗	XRF SAMPLE	==	IMPROVED ROAD
⊗ ^W	WATER SAMPLE GROUND AND SURFACE	- - -	UNIMPROVED ROAD
Y	OPEN ADIT	▨	STRUCTURE
+	COLLAPSED ADIT	⬮	PONDED WATER
→	DRAINAGE	▲	SLOPE DIRECTION
- - ->	DRY DRAINAGE	⬮	WASTE ROCK DUMP OR TAILINGS PILE

DRAWN FOR:

PIONEER
TECHNICAL SERVICES, INC.

TITLE:

WOODROW WILSON
PA# 25-258

DRAWING NO.: PT340230
DATE: 11/15/84

REV: -
PLOT SCALE: 1 = 20

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): N/A

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): N/A

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): N/A

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): N/A

Comments on potential for mitigation: N/A

SAMPLERS: West

D-Direct reading (Kelway Meter) ; S-Saturated Paste (Orion Meter)

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes X, No , Number: 1 Identification: AD-1

Filled shafts: Yes , No X, Number: Identification:

Seeps/Springs: Yes X, No , Number: ? Identification: Several on hillside above (south of) mine

Groundwater wells within 4 miles?: Yes X, No ;

Number of well logs: 28

Distance to nearest well used for drinking:

 <1,000 ft; 1,000 ft to 0.5 miles; X >0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW); Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter), temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite , Probable , Possible X, Unlikely .

Shallow groundwater; large, uncontained source; sulfides

Approximate Depth to Groundwater: X <25 ft; 25 - 100 ft; >100 ft.

Other observations/notes: N/A

SAMPLERS: Clark

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes X, No , Name(s): West Fork of West Fork of Banner Creek

Dry streambeds: Yes , No X, Name(s):

Other surface water: Yes X, No , Name(s)/Description: Adit discharge

Waste materials within any floodplain: Yes X, No Source ID(s): WR-1

Approximate Flood frequency? X 1 yr, 10 yr, 100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? 15 gpm
High Flow: 100 gpm, Average Flow: 10 gpm

Distance between waste source(s) and nearest surface water body (ft)? 0 feet

Surface water draining onto or through waste sources: Yes X, No ,
Describe: Creek and AD-1 through WR-1

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Drinking water in Helena; fishery; wetlands

Observed erosional/sedimentation/stream turbidity problems? Yes , No X. Distance downstream (ft)? 0-500 ; 500-1,000 ; >1,000 .
Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): Iron-staining downstream for 1/4 mile.

SURFACE WATER INVENTORY FORM

SAMPLERS: Clark

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SAMPLE LOCATION	pH	SC μS/cm 25°C	Temp °C	ALK. mg/L as CaCO ₃	Flow cfs/gpm	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
SW-1	SW	Downstream of site and adit discharge in West Fork of West Fork of Banner Creek	6.82	187	17.6	8	15 gpm (E)	25-258-SW-1	07/28/94 1215	T-Metals, TDS, Hardness, Cl, SO ₄ , NO ₂ /NO ₃
SE-1	SE	Downstream of site and adit discharge in West Fork of West Fork of Banner Creek	N/A	N/A	N/A	N/A	N/A	25-258-SE-1	07/28/94 1215	T-Metals
SW-2	SW	Downstream of part of dump and upstream of adit discharge	5.50	54	17.4	0	10 gpm (E)	25-258-SW-2	07/28/94 1245	T-Metals, TDS, Hardness, Cl, SO ₄ , NO ₂ /NO ₃
SE-2	SE	Downstream of part of dump and upstream of adit discharge	N/A	N/A	N/A	N/A	N/A	25-258-SE-2	07/28/94 1245	T-Metals
SW-3	SW	Upstream of mine in West Fork of West Fork of Banner Creek	5.83	92	11.4	0	5 gpm (E)	25-258-SW-3	07/28/94 1350	T-Metals, TDS, Hardness, Cl, SO ₄ , NO ₂ /NO ₃
SE-3	SE	Upstream of mine in the West Fork of the West Fork of Banner Creek	N/A	N/A	N/A	N/A	N/A	25-258-SE-3	07/28/94 1350	T-Metals
Pond		Settling pond above road	5.30	55	17.4	0	N/A	N/A	N/A	Field Parameters
AD-2		Adit discharge after flowing over WR-1	6.09	595	20.1	6	N/A	N/A	N/A	Field Parameters

FLOW: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO₃)
Presence of evaporative salt deposits? (ESD)
Discolored or turbid seepage? (SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?
Presence of ferric hydroxide precipitates? (FEOX)
Presence of burned or stressed vegetation? (VEG)
pH \leq 5.0 (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? 1 to 2 acres

Wetlands present: Yes X, No , Describe: Above mine on hillside; swampy area

Carbonate rocks/soils: Yes , No X, Describe:

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10 ; 10-30 X; 30-100 ;
100-300 ; 300-1,000 ; 1,000-3,000 ; 3,000-10,000 ; 10,000 or
greater ; Comments

Nearest residence: <1,000 ft; 1,000 ft - 0.5 miles; X >0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

SAMPLERS: Clark, West

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X,
Describe: _____

Population within 1 mile: 1-10 X; 10-30____; 30-100____; 100-300____;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____;
Comments _____

Evidence of recreational use on site: Yes X, No____, Describe: Litter;
campfire rings; gun shell casings; 4-wheeler tracks

Accessibility (check each that apply): X Easily accessible - no fences,
gates, or warning signs;____ Moderately Accessible - barbed wire fences,
road gated, or signs posted;____ Difficult Access - chain-link fence,
road gated and locked, site guarded (does not include locked or manned
access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment _____
Wilderness Area - Yes____, No X, Comment _____
T&E Species Habitat - Yes____, No X, Comment _____
Bat Habitat - Yes____, No X, Comment _____

Primary Drainage____; Secondary Drainage____; No Information X:

Riparian Habitat Quality - High____, Medium____, Low____

Wetlands Frontage - High____, Medium____, Low____

Fisheries Habitat and Species Classification - ____

Sport Fishery Classification - ____

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes____, No X, Number____, types and locations:____

Hazardous structures: Yes X, No____, Number 1, types and locations:____
Old cabin west of site

Unstable highwalls, pits, trenches, slopes: Yes X, No____, Number 2,
types and locations:____ Slopes into collapsed adit are unstable; hole
where adit is caving back from ditch

Unstable waste piles, impoundments, undercut banks: Yes X, No____,
Number 1, types and locations:____ Stream undercuts west side of WR-1.

Fire and/or Explosion hazards: Yes____, No X, Explain:_____

Bibliography

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0,
Prepared by Montana Natural Resource Information System, December
1989.

MDSL/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for
Woodrow Wilson, Prepared by Robert Peccia & Associates, July 20,
1988.

USGS, Topographic Map, Three Brothers, Montana, 7 1/2 minute Quadrangle,
1985.

LABORATORY ANALYTICAL DATA

**WOODROW WILSON
PA NO. 25-258**

Woodrow Wilson PA# 25-258
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - TUESDAY
INVESTIGATION DATE: 07/28/94

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	Ag (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
25-258-SE1	1.3 UJX	163 J	19.9	2.8	4.2	2.0 U	32.7	42500	0.20	70.2	4.2 U	34.7	15.1 UJ	33.4	NR
25-258-SE2	1.7 JX	67.4 J	18.7	1.0 U	3.9	1.7 U	18.0	20300	0.34	247	4.7	35.7	12.6 UJ	50.9	NR
25-258-SE3	7.1 JX	189 J	16.3	3.3 U	6.9 U	5.6 U	27.0	90000	0.58	34.8	11.8 U	49.8	42.1 UJ	20.1	NR
25-258-WR1	6.5 JX	295 J	28.3	0.7 U	1.5 U	1.2 U	12.0	10800	1.30	20.1	2.6 U	49.5	30.0 J	7.04	NR
BACKGROUND	0.8 UJX	18.9 J	117	3.5	5.1	1.9	13.5	8300	0.03	1480	4.5	93.2	9.4 UJ	130	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL			SULFUR			PYRITIC			SULFUR		
	SULFUR	ACID BASE	NEUTRAL	ACID BASE	POTENT.	%	SULFUR	ACID BASE	POTENT.	SULFUR	ACID BASE	POTENT.
	%	U/1000t	U/1000t	U/1000t	U/1000t	%	%	U/1000t	U/1000t	%	U/1000t	U/1000t
25-258-WR1	0.08	2.50	-0.33	-2.8	0.08	<0.01	<0.01	0.00	-0.33			

WATER MATRIX ANALYSES

Metals in Water
Results in ug/L

FIELD ID	Ag	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
25-258-AD1	0.12 U	5.0	5.8	4.0 UX	8.4 U	6.8 U	5.9 U	762	0.08 U	134	14.4 U	1.5	51.6 U	44.2 J	18.6
25-258-SW1	0.28	7.8	9.5	4.0 UX	8.4 U	6.8 U	5.9 U	1150	0.08 U	160	14.4 U	2.0	51.6 U	40.3 J	16.5
25-258-SW2	0.25	3.7	8.4	4.0 UX	8.4 U	6.8 U	5.9 U	347	0.08 U	118	14.4 U	1.4	51.6 U	38.6 J	14.4
25-258-SW3	0.12 U	2.4	9.7	4.0 UX	8.4 U	6.8 U	5.9 U	490	0.08 U	74.5	14.4 U	2.0	51.6 U	52.2 J	9.4

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Wet Chemistry
Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
25-258-AD1	56	<5	24	0.06	NR
25-258-SW1	5.0	<5	20	0.06	NR
25-258-SW2	5.0	<5	18	0.06	NR
25-258-SW3	44	<5	14	0.06	NR

LEGEND

SE1 - Downstream of site and acid discharge in West Fork of the West Fork of Barnett Creek.
SE2 - Downstream of part of dump and upstream of acid discharge.
SE3 - Upstream of mine in West Fork of the West Fork of Barnett Creek.
WR1 - Composite of the subamples WRLA through 1C.
BACKGROUND - From the Perdue Lumpy/Kang Mine (25-258-SS1).
AD1 - Acid discharge into WRL.
SW1 - Same as sample 25-258-SE1.
SW2 - Same as sample 25-258-SE2.
SW3 - Same as sample 25-258-SE3.

XRF ANALYSIS RESULTS

**WOODROW WILSON
PA NO. 25-258**

Mine Name: Woodrow Wilson PA# 25-258
XRF Field Analyses
Results in PPM

XRF SAMPLE I.D.	CrHl	K	Ca	Tl	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Sr
25-258-WR1A		24982.9	1682.7	1850.31			7425.41					141.746 *	208.18
25-258-WR1B		27239.9	2140.04	1796.12		443.313 *	17536.5					522.098	273.906
25-258-WR1C		41617.1	2191.22	4128.09			8993.66					112.087 *	182.569
25-258-WR1-COMP		28870.5	2077.52	2026.67			11871.3					242.66	211.14
25-258-WR1-COMP-DUP		30600.1	2013.85	2188.43			11733.5					214.884	225.258
XRF SAMPLE I.D.	Zr	Hg	Mo	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th	
25-258-WR1A	161.783		27.0526 *	84.7566 *	226.623			71.9326 *	337.321		38.6586 *	16.0737 *	
25-258-WR1B	136.649		47.7565	64.8043 *	175.51			111.007 *	393.714			29.9193 *	
25-258-WR1C	202.922		16.2252 *		243.934			66.6565 *	519.948			23.1326 *	
25-258-WR1-COMP	185.866		29.3866 *	68.0547 *	206.797			74.8699 *	440.623		35.0528 *	22.3964 *	
25-258-WR1-COMP-DUP	176.512		24.096 *	79.9033 *	205.16			69.0564 *	437.168		33.7254 *	28.9077 *	

* = Estimated Quantity

\$ = Unvalidated Data

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**WOODROW WILSON
PA NO. 25-258**

AIMSS SCORESHEET

SITE NAME:
PA NUMBER:

Woodrow Wilson
25-258

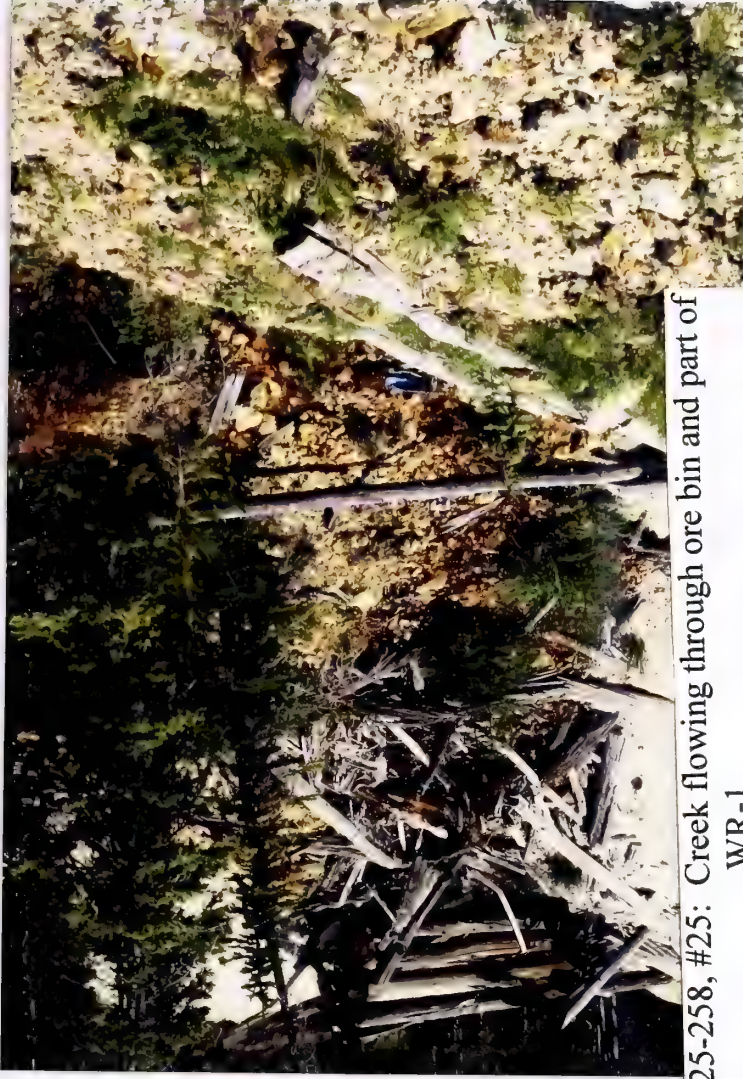
LINE NO.		GROUNDWATER PATHWAY	
1		OBSERVED RELEASE	0
2		EXCEEDENCES	0
3A	GW - LIKELIHOOD	CONTAINMENT	20
3B	OF RELEASE	GW DEPTH	20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
6		WELLS - 1 MI. x 2.5	0.0
7	GW - TARGETS	WELLS - 1 TO 4 MI	28
8		NEAREST WELL	0
9		TARGETS SCORE	LINES 6 + 7 + 8
10		GROUNDWATER SCORE	LINES 4 x 5 x 9
		SURFACE WATER PATHWAY	
11		OBSERVED RELEASE	300
12	SW - LIKELIHOOD	EXCEEDENCES	0
13A	OF RELEASE	CONTAINMENT	20
13B		DISTANCE TO SW	20
13C		POTENTIAL TO RELEASE	LINES 13A x 13B
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
16		DRINKING WATER POP'N	2450
17		IMPACTED DRAINAGE	0
18	SW - TARGETS	WETLANDS	10
19		FISHERY	0
20		RECREATION	5
21		IRRIGATION/STOCK	0
22		T & E SPECIES HABITAT	0
23		TARGETS SCORE	SUM LINES 16 THRU 22
24		SURFACE WATER SCORE	LINES 14 x 15 x 23
		AIR PATHWAY	
25		OBSERVED RELEASE	0
26A	AIR - LIKELIHOOD	CONTAINMENT	5
26B	OF RELEASE	DISTANCE TO POPULATION	5
26C		POTENTIAL TO RELEASE	LINES 26A x 26B
27		LIKELIHOOD SCORE	LINES 25 + 26C
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
29		POPULATION - 4 MILES	10
30		NEAREST RESIDENCE	0
31	AIR - TARGETS	WETLANDS	0
32		PARKS / WILDERNESS	0
33		T & E SPECIES HABITAT	0
34		TARGETS SCORE	SUM LINES 29 THRU 33
35		AIR PATHWAY SCORE	LINES 27 x 28 x 34
		DIRECT CONTACT PATHWAY	
36		OBSERVED EXPOSURE	50
37A	LIKELIHOOD OF	ACCESSIBILITY	20
37B	EXPOSURE	DISTANCE TO POPULATION	5
37C		POTENTIAL EXPOSURE	LINES 37A x 37B
38		LIKELIHOOD SCORE	LINES 36 + 37C
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
40	DIRECT CONTACT	POPULATION - 1 MILE	1
41	TARGETS	NEAREST RESIDENCE	0
42		RECREATIONAL USE	5
43		TARGETS SCORE	SUM LINES 40 THRU 42
44		DIRECT CONTACT SCORE	LINES 38 x 39 x 43
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE		9.69
	(LINES 10 + 24 + 35 + 44) / 100,000		

SITE NAME: Woodrow Wilson
 PA NUMBER: 25-258

LINE NO.	SITE SAFETY		
1	THREAT	ACCESSIBILITY	20
2	HAZARDS	OPEN SHAFTS 100 EA.	0
3		OPEN ADITS 50 EA.	0
4		UNSTAB. HIWALLS / PITS 75 EA.	150
5		HAZ. STRUCTURES 40 EA.	40
6		EXPLOSIVES	0
7		HAZ. MATERIALS	0
8		HAZARDS SCORE SUM LINES 2 THRU 7	190
9	TARGETS	POPULATION - 1 MILE	1
10		NEAREST RESIDENCE	0
11		RECREATIONAL USE	5
12		TARGETS SCORE SUM LINES 9 THRU 11	6
13		SITE SAFETY SCORE (LINES 1 x 8 x 12) / 1,000	22.80



25-258, #24: Adit discharge



25-258, #25: Creek flowing through ore bin and part of
WR-1

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: PETER PA#: 25-259

Date: July 28, 1994 Time: 0915-1130

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Clark, West; Pioneer

Visitors: None

Weather/Seasonality Observations: Warm; sunny; dry summer.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #19: Adit discharge onto WR-1; #20: WR-1 from below; #21: SW-1 sample location downstream of WR-1; #22: Creek eroding east side of WR-1; #23: Iron staining in West Fork from Woodrow Wilson mine above.
Video Tape No. 2

General Comments/Observations (not covered specifically in attached Inventory Forms): N/A

Other Hazardous Materials/Substances Present: Garbage barrel has an auto battery in it.

General Comments on Potential Remedial Alternatives: Recontour and revegetate dump; reroute the adit discharge; isolate stream from the dump.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): PETER PA#: 25-259

Legal Description: T 8N ; R 5W ; Sec. 20 , SW 1/4 SW 1/4 1/4

County: LEWIS & CLARK Mining District: RIMINI

Latitude: N 46° 25' 27.2" Longitude: W 112° 15' 42.7"

Primary Drainage Basin and Code: Banner Creek/10030101

Secondary Drainage Basin: West Fork Banner Creek

USGS Quadrangle map name(s): Three Brothers

Mine Type/Commodities: Hardrock/Gold, Silver, Silica

Activity Status: Active , Inactive/Exploration , Abandoned X .

Ownership: Known Y N X ; private/public? Private

Owner, Agent, or Contact (Include address and phone when available): Unknown

Relationship to other mines/sites in the area/district: Northeast of May Lillie Mine; Woodrow Wilson Mine to southwest 1/4 mile.

Regulatory Status (Activity by other agencies)? Hardrock permits?
Past Reclamation Activities? N/A

General site features: Elevation 7400' , Slope 0-20° ,
Aspect Northwest

Land use: Mining , Recreational X , Residential , Urban ,
Agricultural , Other (Specify) Hunting cabin

Area of disturbed/unvegetated lands? 0.25 acre(s) .

Site Dimensions: 100 feet x 100 feet

Predominant vegetation types: Engelmann spruce, Douglas fir, alder

Access: roads - good (paved) , poor (maintained dirt road) ,
4wd X , trail .

Other logistical considerations (proximity to other sites).
Woodrow Wilson Mine uphill to the southwest; Perseverance Placer downstream to the northeast.

Well logs within 1 mile radius; (Attach MEMG Well Log Printout(s): There are no wells reported within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). Site lies on the East Fork of the West Fork of Banner Creek, which flows north away from the site. The East Fork flows into the West Fork approximately 1/4 mile below the site and into Banner Creek approximately 1/4 mile past that. Banner Creek flows mostly north to confluence with Tenmile Creek 4.5 to 5 miles away.

Mining/milling history, ore type/tenor, host rock, gangue: No information available.

Mine Operation?

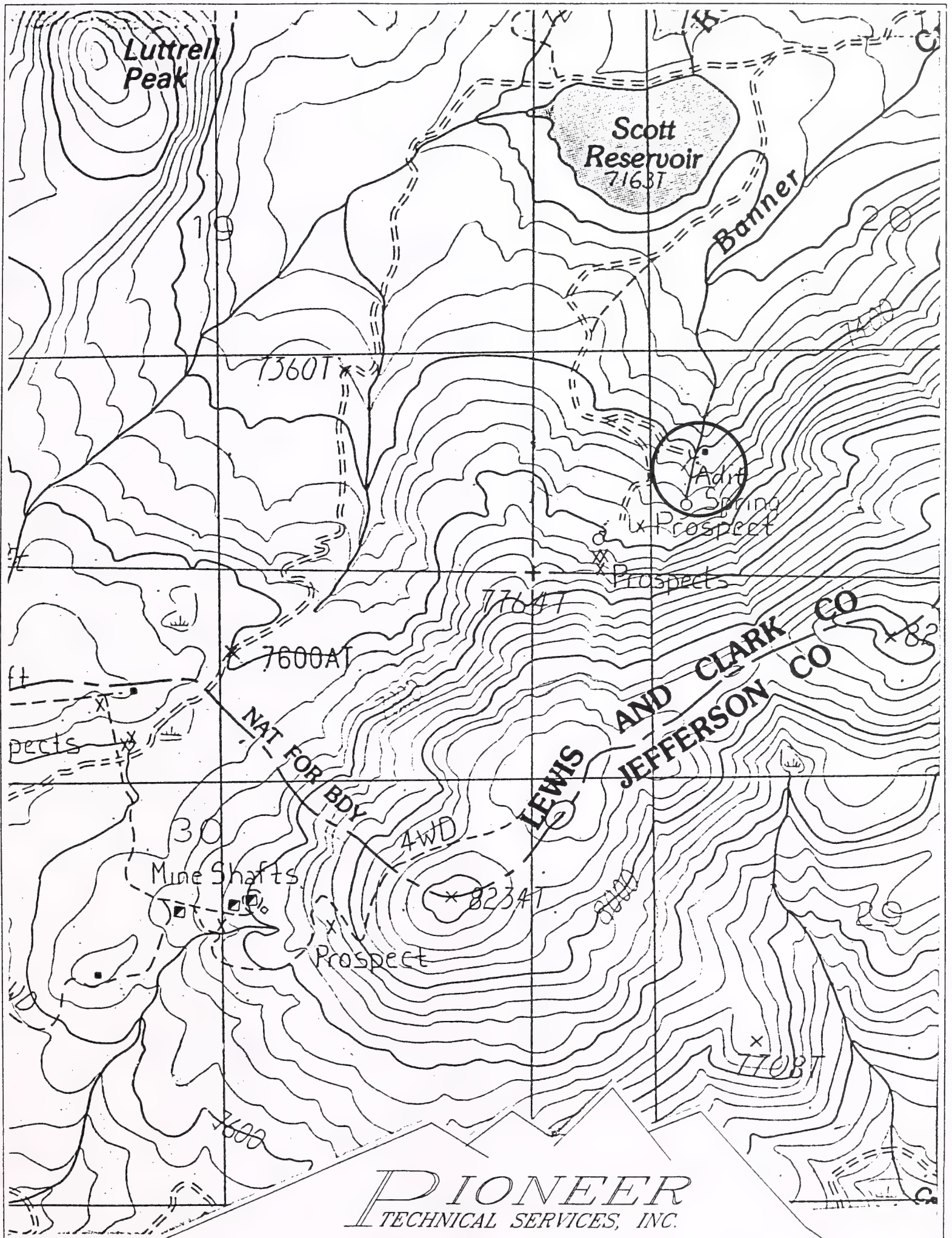
Shafts - Yes , No X, # , Comment
Adits - Yes X, No , # 2, Comment 1 with discharge
Pits - Yes , No X, # , Comment
Placers - Yes , No X, # , Comment
Other - Yes , No X, # , Comment

Mill Operation? Yes , No X. If yes answer the next three questions:

Period(s) of Operation: N/A

Origin of Ore Milled - Custom Mill Dedicated Mill ; Number and names of mines that supplied mill feed: N/A

Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting?
N/A



PETER, P.A. NO. 25-259
 T08N, R05W, SECTION 20
 SCALE: 1" = 1000'



II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay):
N/A

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): N/A

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): N/A

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): N/A

Comments on potential for mitigation: N/A

SAMPLERS: West

D-Direct reading (Kalway Meter) ; S-Saturated Paste (Orion Meter)

Comments or deviations from SOPs: 25-259-WR-1 is composite of WR-1A through -1C. See Peerless Jenny/King (25-006) for background soil sample.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes X, No , Number: 1 Identification: AD-1

Filled shafts: Yes , No X, Number: Identification:

Seeps/Springs: Yes X, No , Number: 2 Identification: One along road; one near cabin

Groundwater wells within 4 miles?: Yes X, No ;

Number of well logs: 28

Distance to nearest well used for drinking:

 <1,000 ft; 1,000 ft to 0.5 miles; X >0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW); Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter), temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite , Probable , Possible X, Unlikely .

Uncontained sources with shallow groundwater

Approximate Depth to Groundwater: X <25 ft; 25 - 100 ft; >100 ft.

Other observations/notes: N/A

SAMPLERS: Clark, West

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes X, No , Name(s): East Fork of West Fork of Banner Creek

Dry streambeds: Yes , No X, Name(s):

Other surface water: Yes X, No , Name(s)/Description: Adit discharge

Waste materials within any floodplain: Yes X, No Source ID(s): WR-1

Approximate Flood frequency? X 1 yr, 10 yr, 100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? 25 gpm
High Flow: 100 gpm, Average Flow: 20 gpm

Distance between waste source(s) and nearest surface water body (ft)? 0 feet

Surface water draining onto or through waste sources: Yes X, No ,
Describe: Adit discharge onto WR-1

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Drinking water use in Helena; fishery; wetlands

Observed erosional/sedimentation/stream turbidity problems? Yes X, No . Distance downstream (ft)? 0-500 X; 500-1,000 ; >1,000 .
Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): Waste rock in sediments 500 feet downstream.

SAMPLERS: Clark

6 (M) peroxide 30 (M) peroxide : 6074

Comments or Deviations from the SOPs (Pioneer SAP, 1993): :

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides?	(SO ₃)
Presence of evaporative salt deposits?	(ESD)
Discolored or turbid seepage?	(SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?	
Presence of ferric hydroxide precipitates?	(FEOX)
Presence of burned or stressed vegetation?	(VEG)
pH \leq 5.0	(pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? 1 to 2 acres below dump in drainage

Wetlands present: Yes X, No , **Describe:** Above mine in marshy area;
some downstream along drainage.

Carbonate rocks/soils: Yes___, No X, Describe:_____

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10___; 10-30 X; 30-100___;
100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or
greater___; Comments_____

Nearest residence: <1,000 ft; 1,000 ft - 0.5 miles; X >0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:

observed	high	moderate	low	none
----------	------	----------	-----	------

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Tuesday, Clark, West

[illegible]

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes ?, No ,
Describe: Hunting cabin on-site

Population within 1 mile: 1-10 X; 10-30 ; 30-100 ; 100-300 ;
300-1,000 ; 1,000-3,000 ; 3,000-10,000 ; 10,000 or greater ;
Comments

Evidence of recreational use on site: Yes X, No , Describe: Recent
use of cabin; litter; campfire rings; abandoned autos

Accessibility (check each that apply): X Easily accessible - no fences,
gates, or warning signs; Moderately Accessible - barbed wire fences,
road gated, or signs posted; Difficult Access - chain-link fence,
road gated and locked, site guarded (does not include locked or manned
access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes , No X, Comment

Wilderness Area - Yes , No X, Comment

T&E Species Habitat - Yes , No X, Comment

Bat Habitat - Yes , No X, Comment

Primary Drainage ; Secondary Drainage ; No Information X :

Riparian Habitat Quality - High , Medium , Low

Wetlands Frontage - High , Medium , Low

Fisheries Habitat and Species Classification -

Sport Fishery Classification -

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes , No X, Number , types and locations:

Hazardous structures: Yes , No X, Number , types and locations:
Cabin is in good shape.

Unstable highwalls, pits, trenches, slopes: Yes , No X, Number ,
types and locations:

Unstable waste piles, impoundments, undercut banks: Yes X, No ,
Number 1, types and locations: Stream undercutting east side of waste
rock dump.

Fire and/or Explosion hazards: Yes , No X, Explain:

Bibliography

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0,
Prepared by Montana Natural Resource Information System, December
1989.

MDSL/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for
Peter, Prepared by Robert Peccia & Associates, July 20, 1988.

USGS, Topographic Map, Three Brothers, Montana, 7 1/2 minute Quadrangle,
1985.

LABORATORY ANALYTICAL DATA

**PETER
PA NO. 25-259**

Peter PA# 25-259
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - TUESDAY
INVESTIGATION DATE: 07/28/94

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	Ag (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
25-259-SE1	0.9 UJX	93.7 J	20.5	1.5	27.4	1.4 U	20.5	14500	0.07	775	12.8	27.4	10.3 UJ	179	NR
25-259-SE2	1.4 UJX	117 J	46.4	1.3 U	17.2	4.4	43.7	32100	0.06	723	10.0	41.6	16.5 UJ	87.8	NR
25-259-WR1	2.0 JX	142 J	14.2	0.9	2.5	1.1 U	13.1	16500	0.78	225	3.8	22.7	8.5 UJ	23.6	NR
BACKGROUND	0.8 UJX	18.9 J	117	3.5	5.1	1.9	13.5	8300	0.03	1480	4.5	93.2	9.4 UJ	130	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL		NEUTRAL		SULFUR		SULFATE		PYRITIC		ORGANIC		PYRITIC		SULFUR	
	SULFUR %	ACID BASE U/1000t	POTENT. U/1000t	ACID BASE U/1000t	POTENT. U/1000t	ACID BASE U/1000t	SULFUR %	SULFUR %	SULFUR %	SULFUR %	SULFUR %	SULFUR %	ACID BASE U/1000t	ACID BASE U/1000t	POTENT. U/1000t	ACID BASE U/1000t
25-259-WR1	0.28	8.75	1.32	-7.4	0.25	<0.01	0.03	0.00	1.32							

WATER MATRIX ANALYSES

Metals in Water
Results in ug/L

FIELD ID	Ag	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn (mg CaCO3/L)	HARDNESS CALC.
25-259-AD1	0.12 U	10.2	11.0	5.5 JX	8.4 U	6.8 U	5.9 U	4870	0.08 U	329	14.4 U	1.6	51.6 U	95.7 J	28.0
25-259-SW1	0.12 U	2.9	5.5 U	4.0 UX	8.4 U	6.8 U	5.9 U	148	0.08 U	17.1	14.4 U	1.3	51.6 U	15.6 U	26.5
25-259-SW2	0.12 U	2.3	5.5 U	4.0 UX	8.4 U	6.8 U	5.9 U	102	0.08 U	9.3	14.4 U	1.6	51.6 U	15.6 U	25.2

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Wet Chemistry
Results in mg/l

FIELD I.D.	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
25-259-AD1	9	<5	39	0.06	NR
25-259-SW1	59	<5	13	0.06	NR
25-259-SW2	60	<5	11	0.06	NR

LEGEND

SE1 - Downstream of mine in East Fork of West Fork of Banner Creek.
SE2 - Upstream of mine in East Fork of West Fork of Banner Creek.
WR1 - Composite of WRIA through 1C.
BACKGROUND - From the Portlaw Jenny/King Mine (25-004-SS1).

AD1 - Acid discharge on WRI.
SW1 - Same as sample 25-259-SE1.
SW2 - Same as sample 25-259-SE2.

XRF ANALYSIS RESULTS

**PETER
PA NO. 25-259**

Mine Name: Peter PA# 25-259
XRF Field Analyses
Results in PPM

XRF SAMPLE I.D.	CrHI	K	Ca	Ti	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Sr
25-259-SE500		14108.8	4173.85	1476.1		1342.36 *	21882				92.4137 *	55.3705 *	187.192
25-259-WR1A		22940.5	1642.83	970.735			20853.8					244.447	278.912
25-259-WR1B		36390.6	4219.72	3405.76		1332.85 *	30594.6						145.112
25-259-WR1C		23761.9	1506.61	1625.55			11036.9				70.4493 *	232.741	216.59
25-259-WR1-COMP		30199.4	1979.94	1836.53		616.98 *	21842.4					248.505	236.363
25-259-WR1-COMP-DUP		30180.4	2076.25	1534.9		653.01 *	22448.9					252.07	244.809

XRF SAMPLE I.D.	Zr	Hg	Mo	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th
25-259-SE500	122.149				170.197				556.521			14.4505 *
25-259-WR1A	191.425		16.0008 *		169.428			72.2514 *	417.656			18.0775 *
25-259-WR1B	190.7		9.33106 *		231.015				671.962			29.6057 *
25-259-WR1C	185.848		20.3768 *		152.795				246.744			14.2686 *
25-259-WR1-COMP	192.331		16.6855 *		189.252			49.0049 *	465.967			14.7586 *
25-259-WR1-COMP-DUP	198.483		11.8199 *		195.364			63.6229 *	437.315			15.8906 *

* = Estimated Quantity

\$ = Unvalidated Data

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**PETER
PA NO. 25-259**

AIMSS SCORESHEET

SITE NAME:
PA NUMBER:

Peter
25-259

LINE NO.		GROUNDWATER PATHWAY	
1		OBSERVED RELEASE	0
2		EXCEEDENCES	0
3A	GW - LIKELIHOOD OF RELEASE	CONTAINMENT	20
3B		GW DEPTH	20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B 400
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C 400
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 0.124
6	GW - TARGETS	WELLS - 1 MI. x 2.5	0.0
7		WELLS - 1 TO 4 MI	28
8		NEAREST WELL	0
9		TARGETS SCORE	LINES 6 + 7 + 8 28.0
10		GROUNDWATER SCORE	LINES 4 x 5 x 9 1389
		SURFACE WATER PATHWAY	
11		OBSERVED RELEASE	0
12		EXCEEDENCES	0
13A	SW - LIKELIHOOD OF RELEASE	CONTAINMENT	20
13B		DISTANCE TO SW	20
13C		POTENTIAL TO RELEASE	LINES 13A x 13B 400
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C 400
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 0.140
16	SW - TARGETS	DRINKING WATER POP'N	2450
17		IMPACTED DRAINAGE	1
18		WETLANDS	10
19		FISHERY	0
20		RECREATION	5
21		IRRIGATION/STOCK	0
22		T & E SPECIES HABITAT	0
23		TARGETS SCORE	SUM LINES 16 THRU 22 2466
24		SURFACE WATER SCORE	LINES 14 x 15 x 23 138096
		AIR PATHWAY	
25		OBSERVED RELEASE	0
26A	AIR - LIKELIHOOD OF RELEASE	CONTAINMENT	10
26B		DISTANCE TO POPULATION	5
26C		POTENTIAL TO RELEASE	LINES 26A x 26B 50
27		LIKELIHOOD SCORE	LINES 25 + 26C 50
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 0.001
29	AIR - TARGETS	POPULATION - 4 MILES	10
30		NEAREST RESIDENCE	0
31		WETLANDS	0
32		PARKS / WILDERNESS	0
33		T & E SPECIES HABITAT	0
34		TARGETS SCORE	SUM LINES 29 THRU 33 10
35		AIR PATHWAY SCORE	LINES 27 x 28 x 34 1
		DIRECT CONTACT PATHWAY	
36		OBSERVED EXPOSURE	250
37A	LIKELIHOOD OF EXPOSURE	ACCESSIBILITY	20
37B		DISTANCE TO POPULATION	5
37C		POTENTIAL EXPOSURE	LINES 37A x 37B 100
38		LIKELIHOOD SCORE	LINES 36 + 37C 350
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 0.001
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE	1
41		NEAREST RESIDENCE	0
42		RECREATIONAL USE	10
43		TARGETS SCORE	SUM LINES 40 THRU 42 11
44		DIRECT CONTACT SCORE	LINES 38 x 39 x 43 4
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE (LINES 10 + 24 + 35 + 44) / 100,000		1.39

SITE NAME:
PA NUMBER:

Peter
25-259

LINE
NO.

SITE SAFETY

1	THREAT	ACCESSIBILITY		20
2		OPEN SHAFTS	100 EA.	0
3		OPEN ADITS	50 EA.	0
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	0
5		HAZ. STRUCTURES	40 EA.	0
6		EXPLOSIVES		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 THRU 7	0
9		POPULATION - 1 MILE		1
10	TARGETS	NEAREST RESIDENCE		0
11		RECREATIONAL USE		10
12		TARGETS SCORE	SUM LINES 9 THRU 11	11
13		SITE SAFETY SCORE	(LINES 1 x 8 x 12) / 1,000	0.00



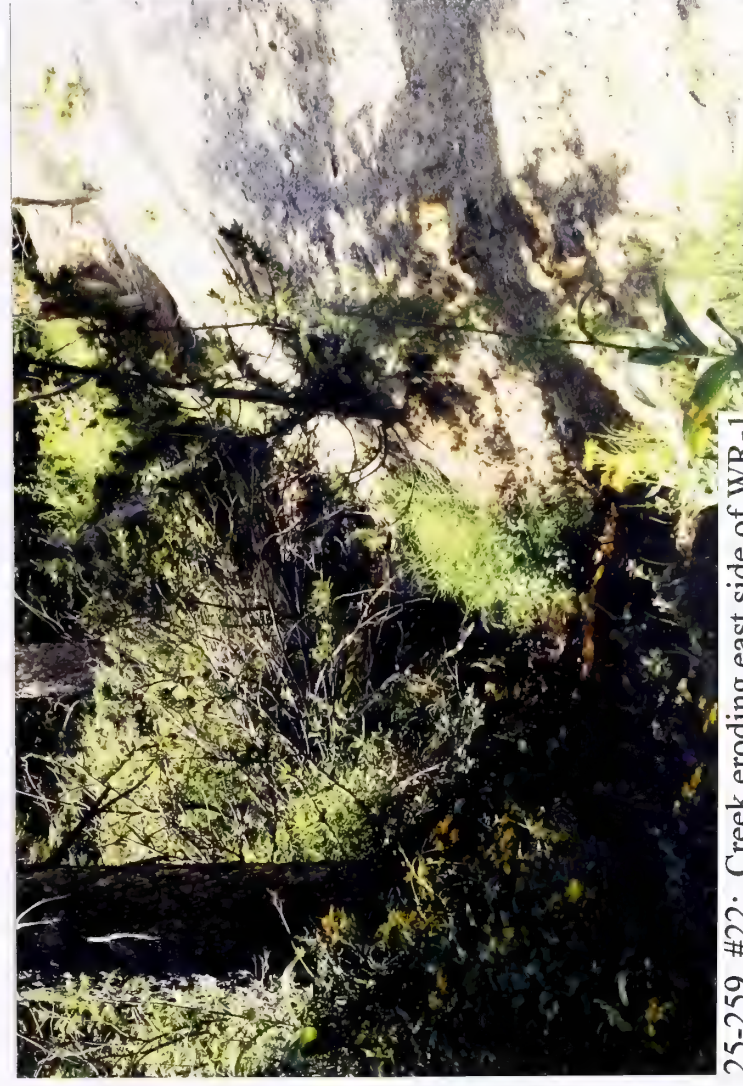
25-259, #19: Adit discharge onto WR-1



25-259, #20: WR-1 from below



25-259, #21: SW-1 sample location



25-259, #22: Creek eroding east side of WR-1



25-259, #23: Iron-staining in West Fork from Woodrow
Wilson Mine above

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: QUEENSBURY PA#: 25-262

Date: July 26, 1994 Time: 1345-1730

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Clark, West; Pioneer

Visitors: None

Weather/Seasonality Observations: Partly cloudy; warm; dry, hot
summer

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #1: South end of WR-
2; #2: North end of WR-2; #3: South end of WR-3; #4: North end of
WR-3; #5: SW-3 sample location downstream; #22: Adit discharge at
WR-1; #23: WR-1 from below; #24: Settling pond below dump, SW-2
sample location at outfall. Video Tape No. 2

General Comments/Observations (not covered specifically in attached Inventory Forms): N/A

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Route adit
discharge away from dump material. Improve settling ponds into
possible treatment ponds. Isolate the dumps from the drainage.
Amend and revegetate the dumps.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): QUEENSBURY PA#: 25-262

Legal Description: T 8N ; R 5W ; Sec. 21 , SE 1/4 NW 1/4 1/4

County: LEWIS & CLARK Mining District: RIMINI

Latitude: N 46° 25' 57" Longitude: W 112° 14' 03"

Primary Drainage Basin and Code: Banner Creek/10030101

Secondary Drainage Basin: Banner Creek

USGS Quadrangle map name(s): Chessman Reservoir

Mine Type/Commodities: Hardrock/Gold, Silver

Activity Status: Active , Inactive/Exploration , Abandoned X .

Ownership: Known Y N X ; private/public? Private

Owner, Agent, or Contact (Include address and phone when available): Unknown

Relationship to other mines/sites in the area/district: Unknown

Regulatory Status (Activity by other agencies)? Hardrock permits?
Past Reclamation Activities? N/A

General site features: Elevation 7320'-7400', Slope 0-10°,
Aspect South to Southwest

Land use: Mining X, Recreational X, Residential , Urban ,
Agricultural , Other (Specify)

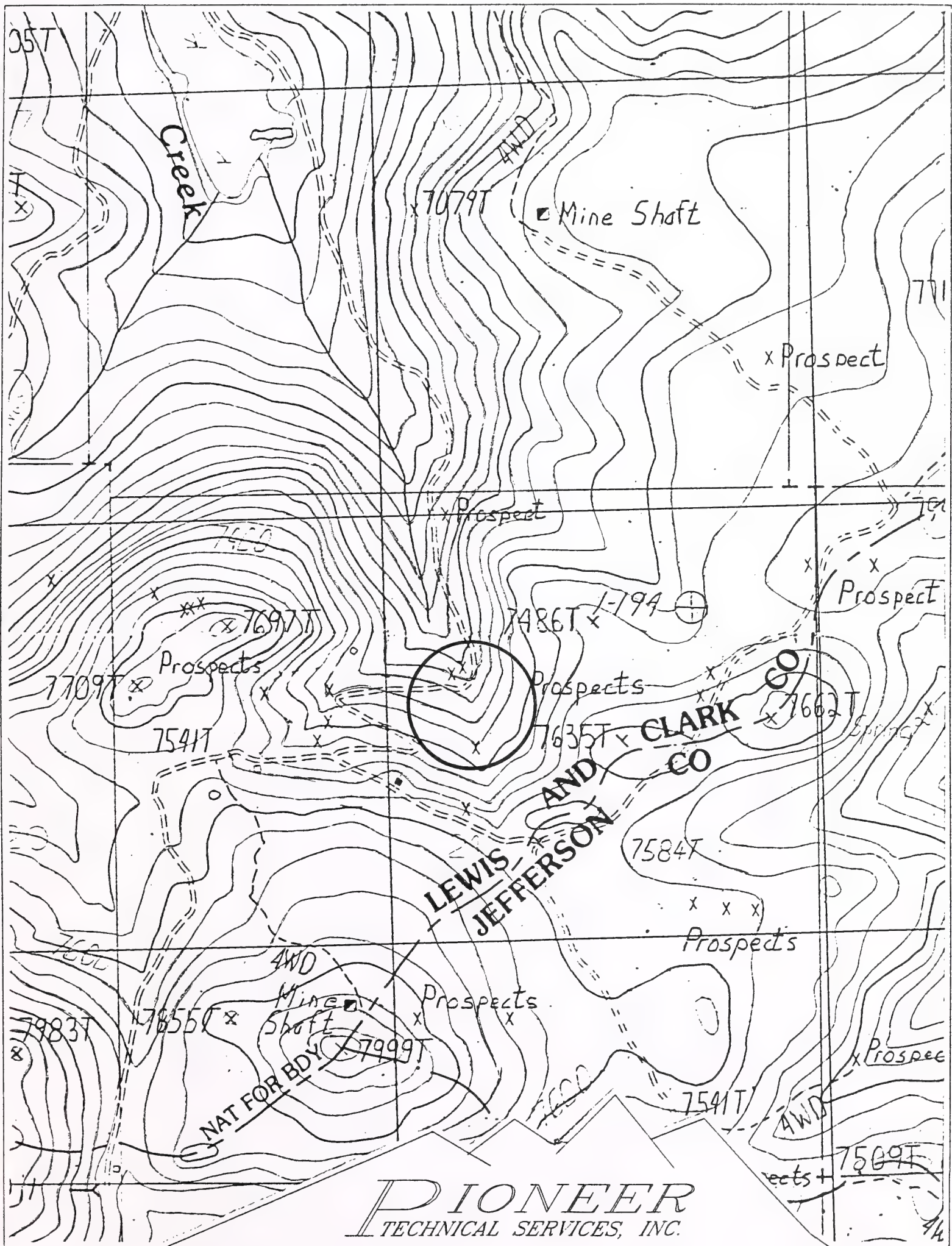
Area of disturbed/unvegetated lands? 2 acre(s) .

Site Dimensions: 100 feet x 500 feet

Predominant vegetation types: Lodgepole pine, Douglas fir

Access: roads - good (paved) , poor (maintained dirt road) ,
4wd X, trail .

Other logistical considerations (proximity to other sites).
Peerless Jenny/King 1/4 mile west; Crescent/Alsace 1 mile southwest;
Gould diggings 0.75 mile west; Ida May is south of the site.

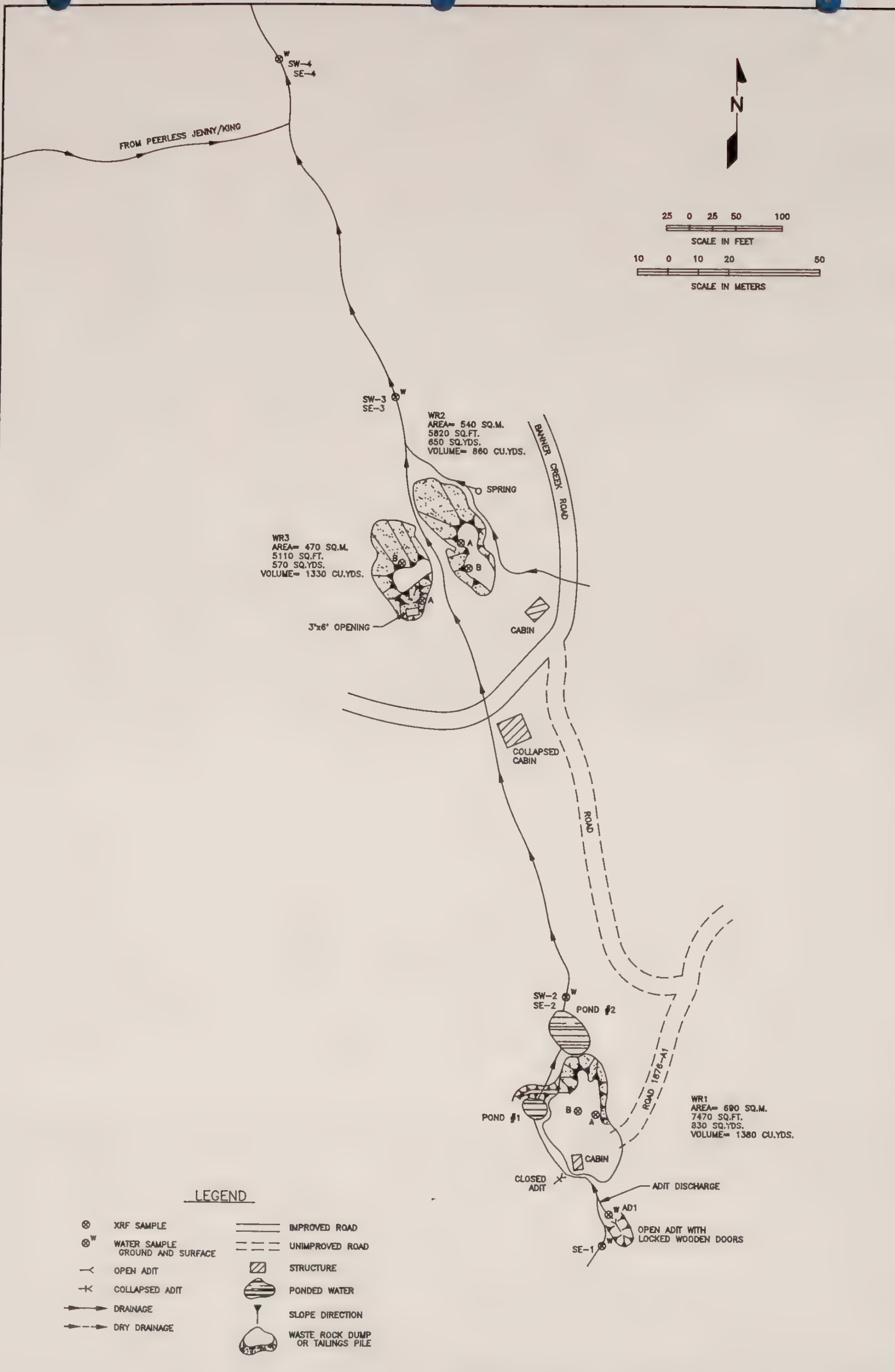



PIONEER
TECHNICAL SERVICES, INC.

QUEENSBURY, P.A. NO. 25-262

T08N, R05W, SECTION 21

SCALE: 1" = 1000'



DRAWN FOR:  PIONEER TECHNICAL SERVICES, INC.	TITLE: QUEENSBURY PA# 25-262	
	DRAWING NO.: PT340245 DATE: 11/19/94	REV: - PLOT SCALE: 1 = 30

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): N/A

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): N/A

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): N/A

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): N/A

Comments on potential for mitigation: N/A

SAMPLERS: Clark

b-Direct reading (Kelway Meter) ; B-Saturated Paste (Orion Meter)

MDSL AMRB/PIONEER 5/16/94

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes X, No , Number: Identification: AD-1

Filled shafts: Yes , No X, Number: Identification:

Seeps/Springs: Yes X, No , Number: 2 Identification: Base of WR-3
and on hillside

Groundwater wells within 4 miles?: Yes X, No ;

Number of well logs: 27

Distance to nearest well used for drinking:

 <1,000 ft; 1,000 ft to 0.5 miles; X >0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite , Probable , Possible X, Unlikely .

Shallow groundwater; large, uncontained source with abundant sulfides.

Approximate Depth to Groundwater: X <25 ft; 25 - 100 ft; >100 ft.

Other observations/notes: N/A

SAMPLERS: Tuesday

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes X, No , Name(s): South Fork of the East Fork of Banner Creek

Dry streambeds: Yes X, No , Name(s): South Fork of the East Fork of Banner Creek above mine

Other surface water: Yes X, No , Name(s)/Description: Adit discharge and 2 sedimentation ponds

Waste materials within any floodplain: Yes X, No Source ID(s): WR-1, -2, and -3 are in Banner Creek floodplain.

Approximate Flood frequency? X 1 yr, 10 yr, 100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? 20 gpm

High Flow: 50 gpm, Average Flow: 10 gpm

Distance between waste source(s) and nearest surface water body (ft)? 0 feet

Surface water draining onto or through waste sources: Yes X, No , Describe: Adit discharges onto WR-1

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Banner Creek is a tributary to Tenmile Creek, which is a drinking water supply to the city of Helena; wetlands, possible residential use, and fishery along Tenmile Creek.

Observed erosional/sedimentation/stream turbidity problems? Yes X, No . Distance downstream (ft)? 0-500 ; 500-1,000 X; >1,000 . Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): Waste rock in streambed downstream.

SURFACE WATER INVENTORY FORM

SAMPLERS: Tuesday

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SAMPLE LOCATION	PH	SC μS/cm 25°C	Temp °C	ALK. mg/L as CaCO ₃	Flow cfs/gpm	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
SE-1	SE	Upstream sediment in drainage	N/A	N/A	N/A	N/A	N/A	25-262-SE-1	07/26/94 1415	T-Metals
SW-2	SW	Below upper mine at outfall	7.41	78	18.8	12	15 gpm (E)	25-262-SW-2	07/26/94 1440	T-Metals, TDS, Hardness, Cl, SO ₄ , NO ₂ /NO ₃
SE-2	SE	Below upper mine at outfall	N/A	N/A	N/A	N/A	N/A	25-262-SE-2	07/26/94 1440	T-Metals
SW-3	SW	Below lower dumps	7.61	72.7	18.2	26	20 gpm (E)	25-262-SW-3	07/26/94 1615	T-Metals, TDS, Hardness, Cl, SO ₄ , NO ₂ /NO ₃
SE-3	SE	Below lower dumps	N/A	N/A	N/A	N/A	N/A	25-262-SE-3	07/26/94 1615	T-Metals
SW-4	SW	Below Peerless drainage	7.76	123	17.2	NM	30 gpm (E)	25-262-SW-4	07/26/94 1700	T-Metals, TDS, Hardness, Cl, SO ₄ , NO ₂ /NO ₃
SE-4	SE	Below Peerless drainage	N/A	N/A	N/A	N/A	N/A	25-262-SE-4	07/26/94 1700	T-Metals

FLOW: Estimated (E) or Measured (M) ?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO₃)
Presence of evaporative salt deposits? (ESD)
Discolored or turbid seepage? (SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?
Presence of ferric hydroxide precipitates? (FEOX)
Presence of burned or stressed vegetation? (VEG)
pH ≤ 5.0 (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? 2 acres below mines in swamps

Wetlands present: Yes X, No , Describe: Many swamps in lower area along creek

Carbonate rocks/soils: Yes , No X, Describe:

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10 ; 10-30 X; 30-100 ;
100-300 ; 300-1,000 ; 1,000-3,000 ; 3,000-10,000 ; 10,000 or
greater ; Comments

Nearest residence: <1,000 ft; 1,000 ft - 0.5 miles; X >0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Tuesday, Clark

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH/MODERATE/LOW/NONE)
WR-1	SO3; FEOX	Dry	7,470	7,470	Yes	Low
WR-2	SO3; FEOX; pH	Dry	5,820	5,820	Yes	Low
WR-3	SO3; FEOX; pH	Dry	5,110	5,110	Yes	Low
AD-1	FEOX	Wet	N/A	N/A	N/A	N/A

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X,
Describe:_____

Population within 1 mile: 1-10 X; 10-30____; 30-100____; 100-300____;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____;
Comments_____

Evidence of recreational use on site: Yes X, No____, Describe: Litter

Accessibility (check each that apply): X Easily accessible - no fences,
gates, or warning signs;____ Moderately Accessible - barbed wire fences,
road gated, or signs posted;____ Difficult Access - chain-link fence,
road gated and locked, site guarded (does not include locked or manned
access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment_____
Wilderness Area - Yes____, No X, Comment_____
T&E Species Habitat - Yes____, No X, Comment_____
Bat Habitat - Yes____, No X, Comment_____

Primary Drainage____; Secondary Drainage____; No Information X:

Riparian Habitat Quality - High____, Medium____, Low____

Wetlands Frontage - High____, Medium____, Low____

Fisheries Habitat and Species Classification - ____

Sport Fishery Classification - ____

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes____, No X, Number____, types and locations:_____

Hazardous structures: Yes X, No____, Number 1, types and locations:____
Cabin at upper adit

Unstable highwalls, pits, trenches, slopes: Yes____, No X, Number____,
types and locations:_____

Unstable waste piles, impoundments, undercut banks: Yes____, No X,
Number____, types and locations:_____

Fire and/or Explosion hazards: Yes____, No X, Explain:_____

Bibliography

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0,
Prepared by Montana Natural Resource Information System, December
1989.

MDSL/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for
Queensbury, Prepared by Robert Peccia & Associates, July 21, 1988.

USGS, Topographic Map, Chessman Reservoir, Montana, 7 1/2 minute
Quadrangle, 1985.

LABORATORY ANALYTICAL DATA

**QUEENSBURY
PA NO. 25-262**

Queensbury PA# 25-262
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - TUESDAY
INVESTIGATION DATE: 07/26/94

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	Ag (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
25-262-SE1	3.1	34.4	90.1	2.1	9.7	5.1	29.6	8710	0.07 JX	897	5.9	156 J	11.7 UJ	140	NR
25-262-SE2	2.3	8.2 U	41.3	1.0 U	2.6	5.2	6.3	3900	0.03 UJX	129	3.5 U	22.4 J	12.6 UJ	61.2	NR
25-262-SE3	1.7	7.7 U	50.2	2.5	4.6	3.7	10.7	4880	0.03 UJX	937	3.3 U	48.1 J	11.7 UJ	156	NR
25-262-SE4	1.0 U	7.8 U	35.0	1.1	3.6	2.0	25.8	3870	0.03 UJX	934	3.4 U	23.9 J	12.0 UJ	191	NR
25-262-WR1	1.5	63.6	104	0.8 U	1.6 U	1.8	4.7	2010	0.41 JX	3.1	2.7 U	96.6 J	9.7 UJ	25.7	NR
25-262-WR2	27.8	31.7	85.9	0.9 U	1.9 U	2.5	50.5	8130	0.37 JX	56.0	3.2 U	727 J	11.5 UJ	86.3	NR
BACKGROUND	0.8 UJX	18.9 J	117	3.5	5.1	1.9	13.5	8300	0.03	1480	4.5	93.2	9.4 UJ	130	NR

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL POTENT.		SULFUR ACID BASE POTENT.		PYRITIC SULFUR		ORGANIC SULFUR		SULFUR ACID BASE POTENT.	
	%	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t
25-262-WR1	0.02	0.62	0.03	-0.6	0.02	-0.6	<0.01	0.00	<0.01	0.00	0.03	0.03
25-262-WR2	0.25	7.81	-1.69	-9.50	0.14	-9.50	0.06	1.87	0.05	0.05	-3.56	-3.56

WATER MATRIX ANALYSES

Metals in Water
Results in ug/L

FIELD ID	Ag	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
25-262-AD1	0.23	11.7	50.7	4.0 UX	8.4 U	7.1	5.9 U	824	0.08 U	170	14.4 U	21.8 J	51.6 U	106 J	19.9
25-262-SW2	0.16	4.9	31.7	4.0 UX	8.4 U	6.8 U	5.9 U	222	0.08 U	55.1	14.4 U	5.0 J	51.6 U	86.9 J	18.9
25-262-SW3	0.15	2.5	41.5	4.3 JX	8.4 U	6.8 U	5.9 U	528	0.08 U	644	14.4 U	3.3 J	51.6 U	98.4 J	22.4
25-262-SW4	0.13	3.2	25.9	4.0 UX	8.4 U	6.8 U	5.9 U	268	0.08 U	351	14.4 U	3.8 J	51.6 U	164 J	47.4

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Requested

Wet Chemistry
Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
25-262-AD1	33	<5	11	0.06	NR
25-262-SW2	406	<5	13	0.06	NR
25-262-SW3	54	<5	11	0.06	NR
25-262-SW4	84	<5	31	0.06	NR

LEGEND

SE1 - Upstream sediment in drainage.

SE2 - Below upper mine at outfall.

SE3 - Below lower dumps.

SE4 - Below Peetlows drainage.

WR1 - Composite of subsamples WR1A and 1B.

WR2 - Composite of subsamples WR2A, 2B, 3A, and 3B.

BACKGROUND - From the Peetlows Quarry/King Mine (23-006-SS1).

AD1 - Upper air discharge (locked and gated); air in Banner Creek.

SW2 - Same as sample 25-262-SE2.

SW3 - Same as sample 25-262-SE3.

SW4 - Same as sample 25-262-SE4.

XRF ANALYSIS RESULTS

**QUEENSBURY
PA NO. 25-262**

Mine Name: Queensbury PA# 25-262
 XRF Field Analyses
 Results in PPM

XRF SAMPLE I.D.	CrHI	K	Ca	Ti	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Sr
25-262-WR1A		26908.7	1452.7	652.756 *			5775.24				64.2285 *	82.6471 *	106.902
25-262-WR1B		33584	1385.59	452.996 *			7775.99				144.204 *		32.5707 *
25-262-WR1B-DUP		34797.2	1320.87	483.714 *			8262.52				134.75 *	69.9205 *	27.6037 *
25-262-WR1-COMP		34430.9	1673.07	501.218 *			7617.21				97.2706 *	76.2736 *	75.105
25-262-WR2A		34200	1361.02	666.799			14734.9				135.644 *		19.7239 *
25-262-WR2B		41538	1835.81	876.241			9149.12						246.315
25-262-WR2-COMP		33845.2	1595.13	684.56			15889.5				145.345 *		130.529
25-262-WR3A		34329.2	1957.36	637.607 *			17226.1				74.5622 *		427.281
25-262-WR3B		32196.4	1430.35	363.703 *			19369.7			166.096 *	336.368		95.6411

XRF SAMPLE I.D.	Zr	Hg	Mo	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th
25-262-WR1A	97.2915		9.64944 *		229.775				537.393			
25-262-WR1B	90.557		12.9809 *	168.916	245.089				527.627			
25-262-WR1B-DUP	95.9782		13.9521 *	167.771	268.894				556.016			
25-262-WR1-COMP	113.12		8.27936 *	89.4066 *	243.417				631.137			
25-262-WR2A	88.7996			704.121	230.189				463.543			
25-262-WR2B	125.33			97.9399 *	273.804				553.389			
25-262-WR2-COMP	99.2033		55.1391	677.999	255.641				470.393			
25-262-WR3A	127.381				281.4				1000.53			19.0796 *
25-262-WR3B	94.0525		256.727	2337.36	284.431				379.709	90.4463 *		20.0626 *

* = Estimated Quantity

\$ = Unvalidated Data

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**QUEENSBURY
PA NO. 25-262**

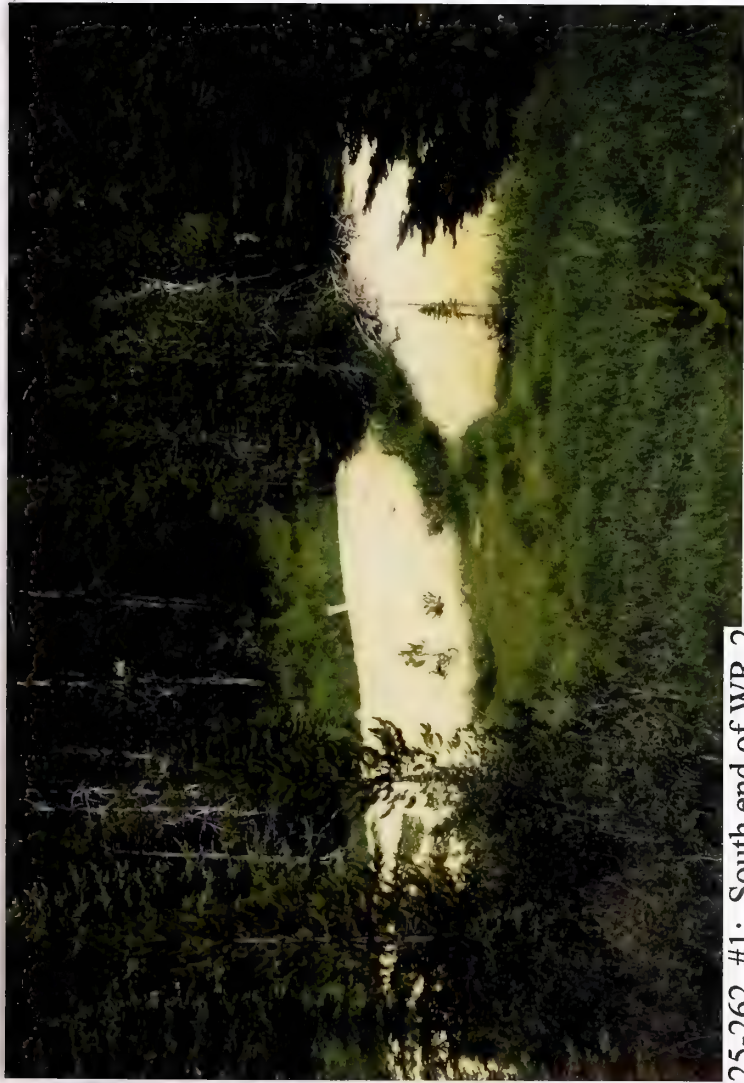
AIMSS SCORESHEET

SITE NAME:
PA NUMBER:

Queensbury
25-262

LINE NO.		GROUNDWATER PATHWAY	
1		OBSERVED RELEASE	0
2		EXCEEDENCES	0
3A	GW - LIKELIHOOD OF RELEASE	CONTAINMENT	20
3B		GW DEPTH	20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B 400
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C 400
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 2.171
6	GW - TARGETS	WELLS - 1 MI. x 2.5	0.0
7		WELLS - 1 TO 4 MI	27
8		NEAREST WELL	0
9		TARGETS SCORE	LINES 6 + 7 + 8 27.0
10		GROUNDWATER SCORE	LINES 4 x 5 x 9 23447
		SURFACE WATER PATHWAY	
11		OBSERVED RELEASE	0
12	SW - LIKELIHOOD OF RELEASE	EXCEEDENCES	50
13A		CONTAINMENT	20
13B		DISTANCE TO SW	20
13C		POTENTIAL TO RELEASE	LINES 13A x 13B 400
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C 450
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 2.374
16	SW - TARGETS	DRINKING WATER POP'N	2450
17		IMPACTED DRAINAGE	1
18		WETLANDS	10
19		FISHERY	0
20		RECREATION	5
21		IRRIGATION/STOCK	0
22		T & E SPECIES HABITAT	0
23		TARGETS SCORE	SUM LINES 16 THRU 22 2466
24		SURFACE WATER SCORE	LINES 14 x 15 x 23 2634428
		AIR PATHWAY	
25		OBSERVED RELEASE	0
26A	AIR - LIKELIHOOD OF RELEASE	CONTAINMENT	5
26B		DISTANCE TO POPULATION	5
26C		POTENTIAL TO RELEASE	LINES 26A x 26B 25
27		LIKELIHOOD SCORE	LINES 25 + 26C 25
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 0.075
29	AIR - TARGETS	POPULATION - 4 MILES	10
30		NEAREST RESIDENCE	0
31		WETLANDS	0
32		PARKS / WILDERNESS	0
33		T & E SPECIES HABITAT	0
34		TARGETS SCORE	SUM LINES 29 THRU 33 10
35		AIR PATHWAY SCORE	LINES 27 x 28 x 34 19
		DIRECT CONTACT PATHWAY	
36		OBSERVED EXPOSURE	50
37A	LIKELIHOOD OF EXPOSURE	ACCESSIBILITY	20
37B		DISTANCE TO POPULATION	5
37C		POTENTIAL EXPOSURE	LINES 37A x 37B 100
38		LIKELIHOOD SCORE	LINES 36 + 37C 150
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 0.066
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE	1
41		NEAREST RESIDENCE	0
42		RECREATIONAL USE	2
43		TARGETS SCORE	SUM LINES 40 THRU 42 3
44		DIRECT CONTACT SCORE	LINES 38 x 39 x 43 30
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE (LINES 10 + 24 + 35 + 44) / 100,000		26.58

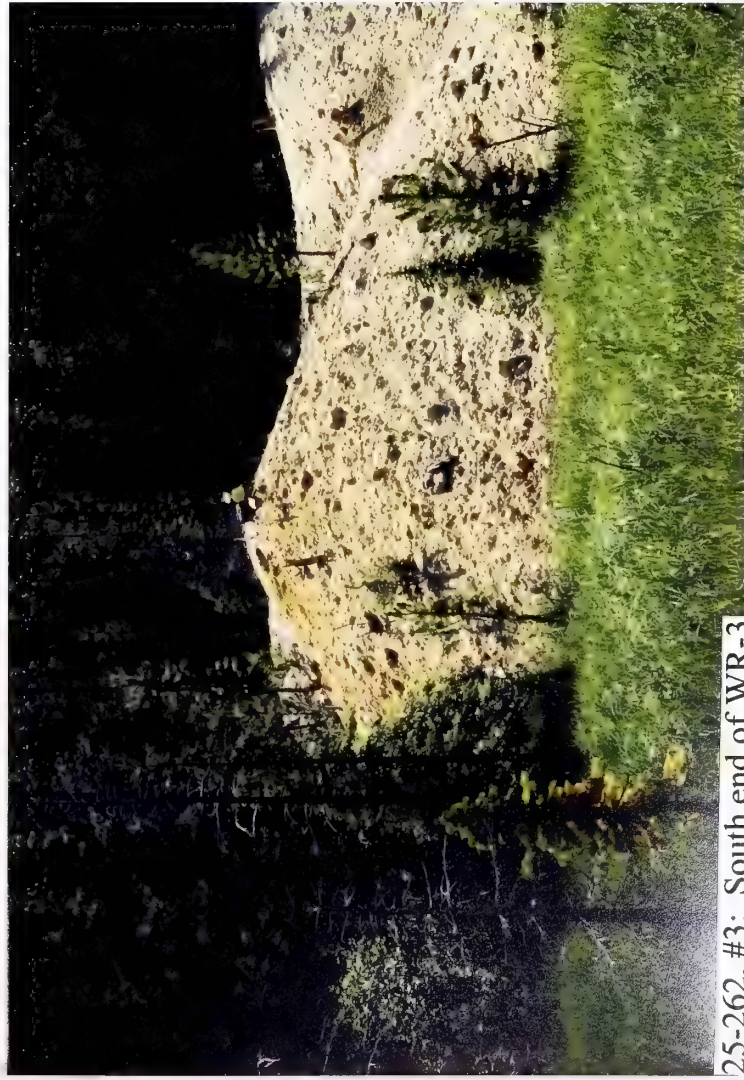
LINE NO.				SITE NAME:	Queensbury
				PA NUMBER:	25-262
	<u>SITE SAFETY</u>				
1	THREAT	ACCESSIBILITY			20
2		OPEN SHAFTS	100 EA.		0
3		OPEN ADITS	50 EA.		0
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.		0
5		HAZ. STRUCTURES	40 EA.		40
6		EXPLOSIVES			0
7		HAZ. MATERIALS			0
8		HAZARDS SCORE	SUM LINES 2 THRU 7		40
9		POPULATION - 1 MILE			1
10	TARGETS	NEAREST RESIDENCE			0
11		RECREATIONAL USE			2
12		TARGETS SCORE	SUM LINES 9 THRU 11		3
13		SITE SAFETY SCORE	(LINES 1 x 8 x 12) / 1,000		2.40



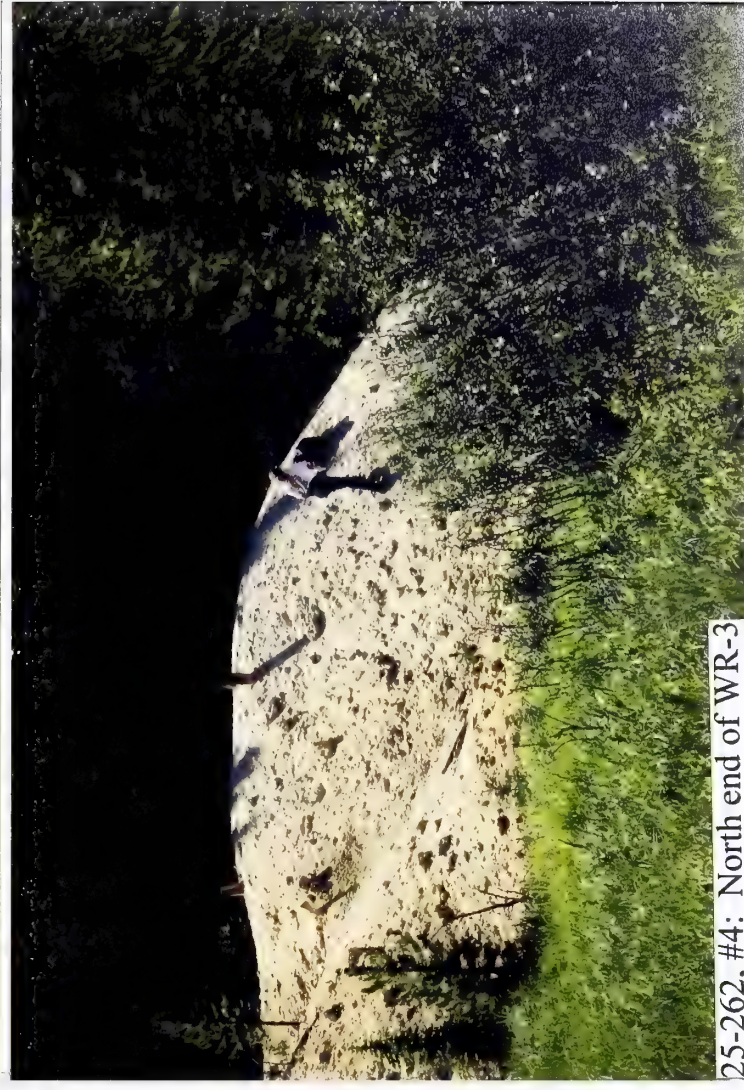
25-262, #1: South end of WR-2



25-262, #2: North end of WR-2



25-262, #3: South end of WR-3



25-262, #4: North end of WR-3



25-262, #5: SW-3 sample location



25-262, #22: Adit discharge at WR-1



25-262, #23: WR-1 from below



25-262, #24: Settling pond below dump; SW-2 sample location

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: MONTE CRISTO PA#: 25-275

Date: July 25, 1994 Time: 1200-1600

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Clark, West; Pioneer

Visitors: Resident; Guardperson

Weather/Seasonality Observations: Warm; sunny; cloudy in
afternoon; rain previous evening; dry, hot summer.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #1: SW-1 sample
location in bog, downstream; #2: AD-1 sample location in ditch; #3:
Discharge ditch and top of WR-1 facing west; #4: Discharge ditch
and top of WR-1 facing east; #5: Red puddle, salt, and elk tracks
on top of WR-1; #6: HMO shaft, headframe, and south half of WR-2;
#7: North half of WR-2; #8: Two eastern HMO shafts; #9: Collapsed
adit below shaft. Video Tape No. 2

General Comments/Observations (not covered specifically in attached Inventory Forms): N/A

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Route adit
discharge around dump; stabilize, amend, and revegetate dumps.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): MONTE CRISTO PA#: 25-275

Legal Description: T 8N ; R 5W ; Sec. 17 , NW 1/4 NW 1/4 NW 1/4

County: LEWIS & CLARK Mining District: RIMINI

Latitude: N 46° 27' 4.7" Longitude: W 112° 15' 59.6"

Primary Drainage Basin and Code: Tenmile Creek/10030101

Secondary Drainage Basin: Ruby Creek

USGS Quadrangle map name(s): Three Brothers

Mine Type/Commodities: Hardrock/Gold, Silver, Copper, Lead

Activity Status: Active , Inactive/Exploration , Abandoned X .

Ownership: Known Y N X ; private/public? Private

Owner, Agent, or Contact (Include address and phone when available): Unknown

Relationship to other mines/sites in the area/district: Numerous mines in the area, most are to the northeast around the town of Rimini.

Regulatory Status (Activity by other agencies)? Hardrock permits?
Past Reclamation Activities? Looks as though some work has been done to redirect adit discharge and establish vegetation on WR-1.

General site features: Elevation 6500'-6600', Slope 10°-15° , Aspect North

Land use: Mining X , Recreational X , Residential X , Urban ,
Agricultural , Other(Specify)

Area of disturbed/unvegetated lands? 1 acre(s) .
Site Dimensions: 400 feet x 125 feet

Predominant vegetation types: Douglas fir, Lodgepole pine

Access: roads - good (paved) , poor (maintained dirt road) ,
4wd X , trail X .

Other logistical considerations (proximity to other sites). Gated at Tenmile Creek Road.

Well logs within 1 mile radius; (Attach MBMG Well Log Printout(s): There are no wells reported within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). Mine is located at contact of the Boulder Batholith (Butte Quartz monzonite) and Tertiary volcanics. 500' to unnamed dry tributary of Tenmile Creek; 500' to 1/4 mile unnamed tributary of Tenmile Creek; 1/4 mile to 15 miles to Tenmile Creek. Steep, bedrock fracture controlled, shallow groundwater - adit discharge and seeps.

Mining/milling history, ore type/tenor, host rock, gangue: Five claims were operated in 1934. Work was being done on the site through 1984. Quartz is the dominant gangue mineral with minor but variable amounts of chalcedony in veins containing economically significant amounts of sulfides. The most common sulfide is pyrite.

Mine Operation?

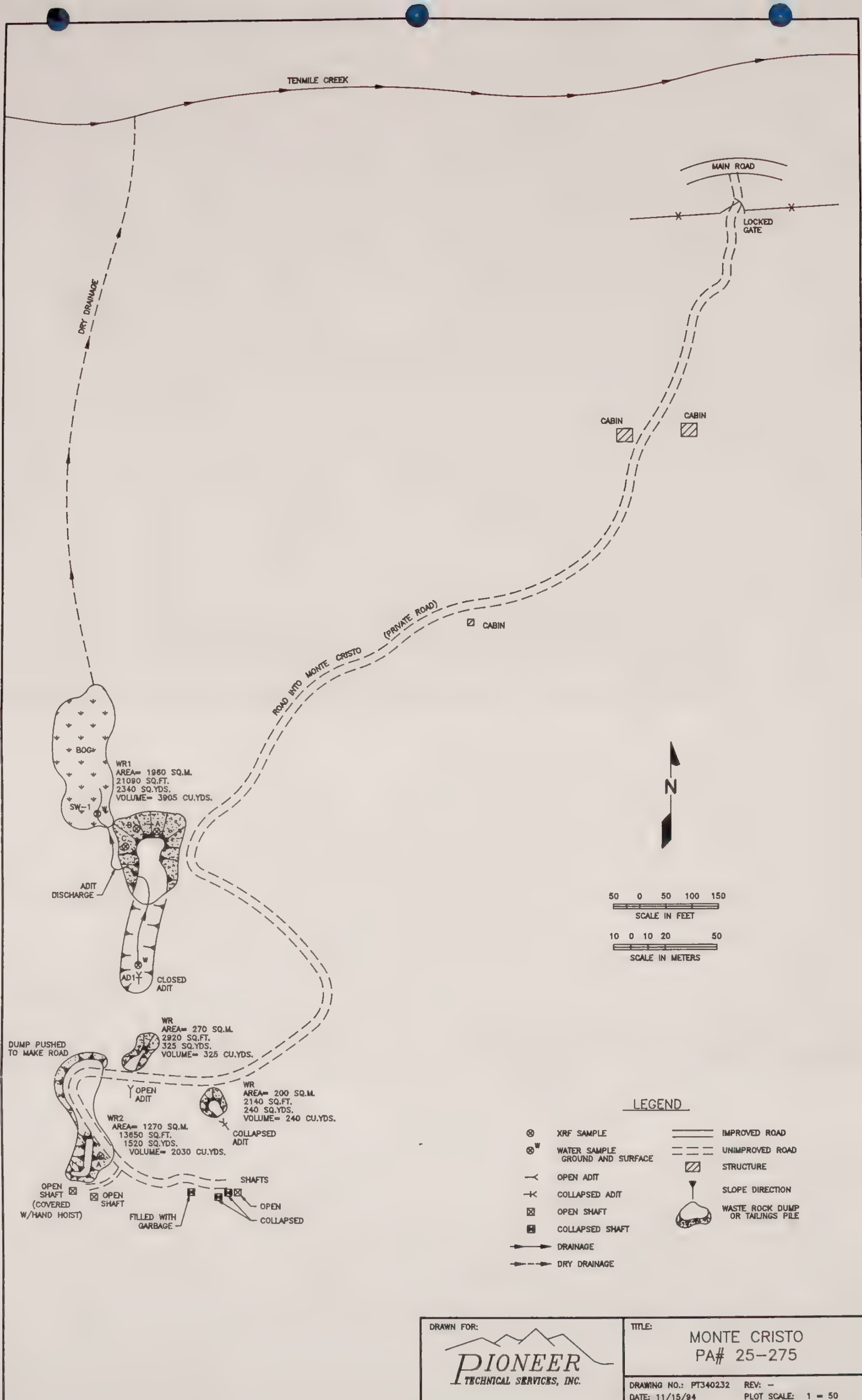
Shafts - Yes X, No , # 6, Comment 2 open
Adits - Yes X, No , # 3, Comment 1 with discharge; 1 open
Pits - Yes , No X, # , Comment
Placers - Yes , No X, # , Comment
Other - Yes , No X, # , Comment

Mill Operation? Yes , No X. If yes answer the next three questions:

Period(s) of Operation: N/A

Origin of Ore Milled - Custom Mill Dedicated Mill ; Number and names of mines that supplied mill feed: N/A

Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting?
N/A



DRAWN FOR:

PIONEER
TECHNICAL SERVICES, INC.

TITLE:

MONTE CRISTO
PA# 25-275

DRAWING NO.: PT340232

REV: -

DATE: 11/15/94

PLOT SCALE: 1 = 50

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay):
N/A

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): N/A

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): N/A

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): N/A

Comments on potential for mitigation: N/A

SAMPLERS: West

D-Direct reading (Kelway Meter) ; S-Saturated Paste (Orion Meter)

MDSL AMRB/PIONEER 5/16/94

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes X, No , Number: 1 Identification: AD-1

Filled shafts: Yes , No X, Number: Identification:

Seeps/Springs: Yes X, No , Number: ? Identification: Several minor seeps on hillside

Groundwater wells within 4 miles?: Yes X, No ;
Number of well logs: 36

Distance to nearest well used for drinking:
 <1,000 ft; 1,000 ft to 0.5 miles; X >0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite , Probable , Possible X, Unlikely .

Shallow groundwater; lead and arsenic in wastes, but adit discharge pH is neutral.

Approximate Depth to Groundwater: X <25 ft; 25 - 100 ft; >100 ft.

Other observations/notes: N/A

SAMPLERS: Tuesday

[illegible]

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or springs?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes____, No X, Name(s): _____

Dry streambeds: Yes X, No____, Name(s): Unnamed tributary of Tenmile Creek

Other surface water: Yes X, No____, Name(s)/Description: Adit discharge to swamp

Waste materials within any floodplain: Yes____, No X Source ID(s): _____

Approximate Flood frequency? ____1 yr, ____10 yr, ____100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? N/A

High Flow: _____, Average Flow: _____

Distance between waste source(s) and nearest surface water body (ft)? 30 feet between WR-1 and unnamed tributary

Surface water draining onto or through waste sources: Yes X, No____, Describe: Adit discharges onto WR-1 then to swamp

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?) Wetlands and possible fishery on upper Tenmile Creek; intake on Tenmile for Helena drinking water is below confluence with unnamed tributary approximately 3 miles.

Observed erosional/sedimentation/stream turbidity problems? Yes____, No X. Distance downstream (ft)? 0-500____; 500-1,000____; >1,000____. Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): Waste rock observed in swamp, but not in dry drainage to west.

SAMPLERS: Tuesday

1 (M) permissio 20 (M) permissio : NOTA

Comments or Deviations from the SOPs (Pioneer SAP, 1993): :

Evaluate each source in table on next page.

Presence and abundance of sulfides?	(SO ₃)
Presence of evaporative salt deposits?	(ESD)
Discolored or turbid seepage?	(SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?	
Presence of ferric hydroxide precipitates?	(FEOX)
Presence of burned or stressed vegetation?	(VEG)
pH ≤ 5.0	(pH)

Area available for treatment (acres)? 2 to 3 acres

Wetlands present: Yes X, No , Describe: 1/2 acre formed by discharge

Carbonate rocks/soils: Yes____, No X, Describe:_____

Population within 4-mile radius: 1-10___; 10-30___; 30-100 X;
100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or
greater___; Comments_____

Nearest residence: <1,000 ft; X 1,000 ft - 0.5 miles; >0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:

observed	high	moderate	low	none
----------	------	----------	-----	------

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Tuesday, West

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH/MODERATE/LOW/None)
WR-1	FEOX; pH	Partial	21,090	12,654	Yes	Low
WR-2	FEOX	Dry	13,650	13,650	Yes	Low
AD-1	Algae in discharge	Wet	N/A	N/A	N/A	N/A

Notes and Clarifications: _____

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X,
Describe:_____

Population within 1 mile: 1-10 X; 10-30____; 30-100____; 100-300____;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____;
Comments_____

Evidence of recreational use on site: Yes X, No____, Describe: Vehicle
tracks; evidence of shooting

Accessibility (check each that apply):____ Easily accessible - no fences,
gates, or warning signs; X Moderately Accessible - barbed wire fences,
road gated, or signs posted;____ Difficult Access - chain-link fence,
road gated and locked, site guarded (does not include locked or manned
access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment_____

Wilderness Area - Yes____, No X, Comment_____

T&E Species Habitat - Yes____, No X, Comment_____

Bat Habitat - Yes____, No X, Comment_____

Primary Drainage X; Secondary Drainage____; No Information____:

Riparian Habitat Quality - High____, Medium____, Low X

Wetlands Frontage - High____, Medium____, Low X

Fisheries Habitat and Species Classification - 4

Sport Fishery Classification - 4

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes X, No____, Number 4, types and locations:____
3 open shafts; 1 open adit

Hazardous structures: Yes____, No X, Number____, types and locations:____

Unstable highwalls, pits, trenches, slopes: Yes____, No X, Number____,
types and locations:_____

Unstable waste piles, impoundments, undercut banks: Yes____, No X,
Number____, types and locations:_____

Fire and/or Explosion hazards: Yes____, No X, Explain:_____

Bibliography

MBMG, Form 39, Monte Cristo, Lewis & Clark County, Montana, 1967-1987.

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0,
Prepared by Montana Natural Resource Information System, December
1989.

MDSL/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for
Monte Cristo, Prepared by Robert Peccia and Associates, July 22,
1988.

USGS, Topographic Map, Three Brothers, Montana, 7 1/2 minute Quadrangle,
1985.

LABORATORY ANALYTICAL DATA

**MONTE CRISTO
PA NO. 25-275**

Monte Cristo PA# 25-275
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - TUESDAY
INVESTIGATION DATE: 07/25/94

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	Ag (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
25-275-WR1	1.9	243	79.4	1.9	4.4	6.7	61.9	24900	0.11 JX	441	6.0	1370 J	42.1 J	105	NR
25-275-WR2	23.6	540	129	4.2	2.8	3.3	121	37100	1.13 JX	511	2.6 U	3610 J	184 J	116	NR
BACKGROUND	0.8 UJX	18.9 J	117	3.5	5.1	1.9	13.5	8300	0.03	1480	4.5	93.2	9.4 UJ	130	NR

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	ACID BASE POTENT. t/1000t	TOTAL SULFUR %	NEUTRAL. POTENT. t/1000t	SULFUR ACID BASE POTENT. t/1000t	SULFATE SULFUR %	PYRITIC SULFUR %	ORGANIC SULFUR %	PYRITIC SULFUR ACID BASE POTENT. t/1000t	SULFUR ACID BASE POTENT. t/1000t
25-275-WR1	0.02	0.62	0.62	3.87	3.25	<0.01	0.02	<0.01	0.62	3.25
25-275-WR2	0.06	1.87	1.87	-0.23	-2.1	0.06	<0.01	<0.01	0.00	-0.23

WATER MATRIX ANALYSES

Metals in Water
Results in ug/L

FIELD ID	Ag	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn (mg CaCO3/L)	HARDNESS CALC.
25-275-AD1	0.51	23.1	21.3	6.4 JX	8.4 U	6.8 U	147	140	0.09	34.9	14.4 U	11.7 J	51.6 U	93.8 J	56.4
25-275-SW1	0.36	20.5	19.4	4.0 UX	8.4 U	6.8 U	54.9	110	0.08 U	25.6	14.4 U	3.4 J	51.6 U	35.8 J	53.4

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Requested

Wet Chemistry
Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
25-275-AD1	95	<5	12	0.13	NR
25-275-SW1	94	<5	10	0.06	NR

LEGEND

WR1 - Composite of subsamples WR1A, 1B, and 1C.

WR2 - Grab sample of the WR2 subsample.

BACKGROUND - From the Porteus Jenny/King Mine (25-90-SS1).

AD1 - Add discharge onto WR1.

SW1 - Discharge after flowing through WR1 and into bog.

XRF ANALYSIS RESULTS

**MONTE CRISTO
PA NO. 25-275**

Mine Name: Monte Cristo PA# 25-275
XRF Field Analyses
Results in PPM

XRF SAMPLE I.D.	CrHl	K	Ca	Tl	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Sr
25-275-WR1A	712.926 *	37414.2	1892.09	988.073			93403.8	806.947 *			340.893	729.089 *	170.289
25-275-WR1B	655.484 *	18298.6	12767.9	3374.8		585.711	32339.2				193.758	74.2732 *	456.386
25-275-WR1C	563.518 *	25655.3	9614.54	2571.4		562.155 *	44596.1				262.796 *	195.01 *	366.183
25-275-WR1-COMP		27230.1	6231.74	1744.72		773.566 *	59375				292.238	311.669 *	314.577
25-275-WR2		30587.9	1781.43	633.784 *		812.318 *	111347			121.132 *	353.953	688.713 *	314.202
XRF SAMPLE I.D.	Zr	Hg	Mo	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th	
25-275-WR1A	146.085		21.6394 *	3748.45	260.15			217.114 *	412.024	130.53 *			
25-275-WR1B	200.728			119.992	161.766				580.424			14.4529	
25-275-WR1C	202.486			726.119	195.457			71.7912 *	501.293				
25-275-WR1-COMP	150.121			1557.63	188.184			121.981 *	469.742	116.817 *		16.4981 *	
25-275-WR2	115.451		13.4847 *	2946	210.27			569.835	334.179				

* = Estimated Quantity

\$ = Unvalidated Data

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**MONTE CRISTO
PA NO. 25-275**

AIMSS SCORESHEET

SITE NAME:
PA NUMBER:

Monte Cristo
25-275

LINE NO.		GROUNDWATER PATHWAY	
1		OBSERVED RELEASE	0
2		EXCEEDENCES	0
3A	GW - LIKELIHOOD OF RELEASE	CONTAINMENT	20
3B		GW DEPTH	20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
6		WELLS - 1 MI. x 2.5	0.0
7	GW - TARGETS	WELLS - 1 TO 4 MI	36
8		NEAREST WELL	0
9		TARGETS SCORE	LINES 6 + 7 + 8
10		GROUNDWATER SCORE	LINES 4 x 5 x 9
			144806
		SURFACE WATER PATHWAY	
11		OBSERVED RELEASE	0
12	SW - LIKELIHOOD OF RELEASE	EXCEEDENCES	0
13A		CONTAINMENT	20
13B		DISTANCE TO SW	10
13C		POTENTIAL TO RELEASE	LINES 13A x 13B
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
16		DRINKING WATER POP'N	2450
17		IMPACTED DRAINAGE	0
18		WETLANDS	10
19	SW - TARGETS	FISHERY	1
20		RECREATION	5
21		IRRIGATION/STOCK	0
22		T & E SPECIES HABITAT	0
23		TARGETS SCORE	SUM LINES 16 THRU 22
24		SURFACE WATER SCORE	LINES 14 x 15 x 23
			5438023
		AIR PATHWAY	
25		OBSERVED RELEASE	0
26A	AIR - LIKELIHOOD OF RELEASE	CONTAINMENT	5
26B		DISTANCE TO POPULATION	10
26C		POTENTIAL TO RELEASE	LINES 26A x 26B
27		LIKELIHOOD SCORE	LINES 25 + 26C
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
29		POPULATION - 4 MILES	30
30		NEAREST RESIDENCE	5
31	AIR - TARGETS	WETLANDS	0
32		PARKS / WILDERNESS	0
33		T & E SPECIES HABITAT	0
34		TARGETS SCORE	SUM LINES 29 THRU 33
35		AIR PATHWAY SCORE	LINES 27 x 28 x 34
			1108
		DIRECT CONTACT PATHWAY	
36		OBSERVED EXPOSURE	50
37A	LIKELIHOOD OF EXPOSURE	ACCESSIBILITY	10
37B		DISTANCE TO POPULATION	10
37C		POTENTIAL EXPOSURE	LINES 37A x 37B
38		LIKELIHOOD SCORE	LINES 36 + 37C
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
40	DIRECT CONTACT	POPULATION - 1 MILE	1
41	TARGETS	NEAREST RESIDENCE	5
42		RECREATIONAL USE	5
43		TARGETS SCORE	SUM LINES 40 THRU 42
44		DIRECT CONTACT SCORE	LINES 38 x 39 x 43
			952
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE (LINES 10 + 24 + 35 + 44) / 100,000		55.85

SITE NAME:
PA NUMBER:

Monte Cristo
25-275

LINE
NO.

SITE SAFETY

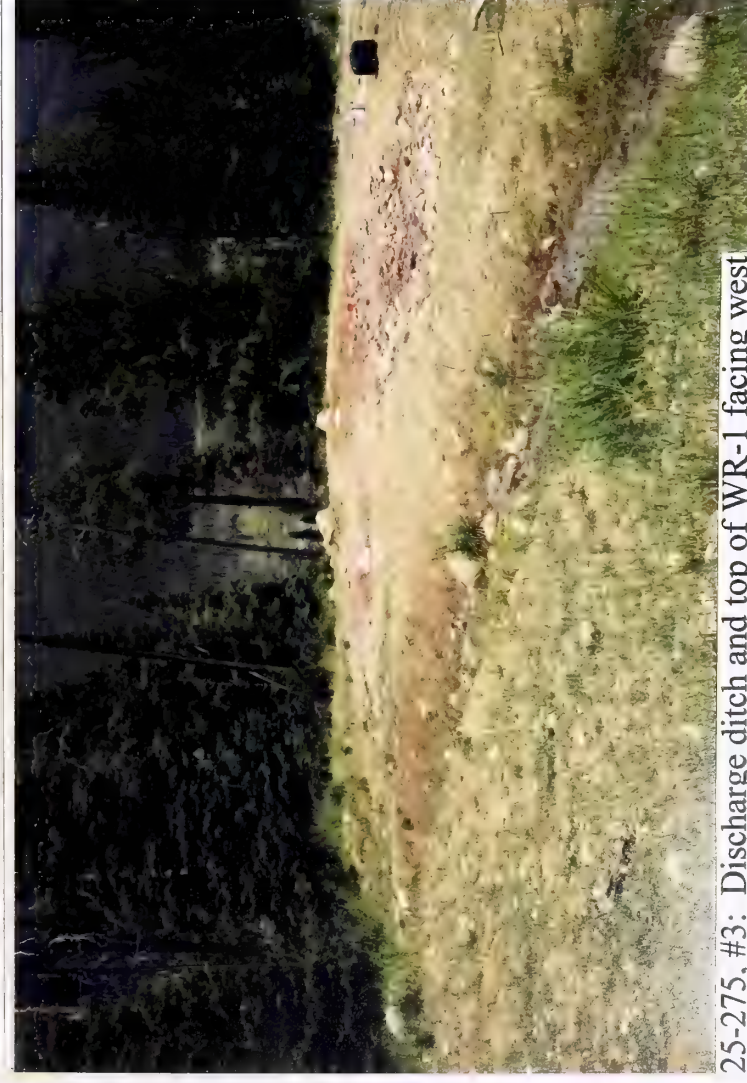
1	THREAT	ACCESSIBILITY		10
2		OPEN SHAFTS	100 EA.	300
3		OPEN ADITS	50 EA.	50
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	0
5		HAZ. STRUCTURES	40 EA.	0
6		EXPLOSIVES		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 THRU 7	350
9		POPULATION - 1 MILE		1
10	TARGETS	NEAREST RESIDENCE		5
11		RECREATIONAL USE		5
12		TARGETS SCORE	SUM LINES 9 THRU 11	11
13		SITE SAFETY SCORE	(LINES 1 x 8 x 12) / 1,000	38.50



25-275, #1: SW-1 sample location



25-275, #2: AD-1 sample location



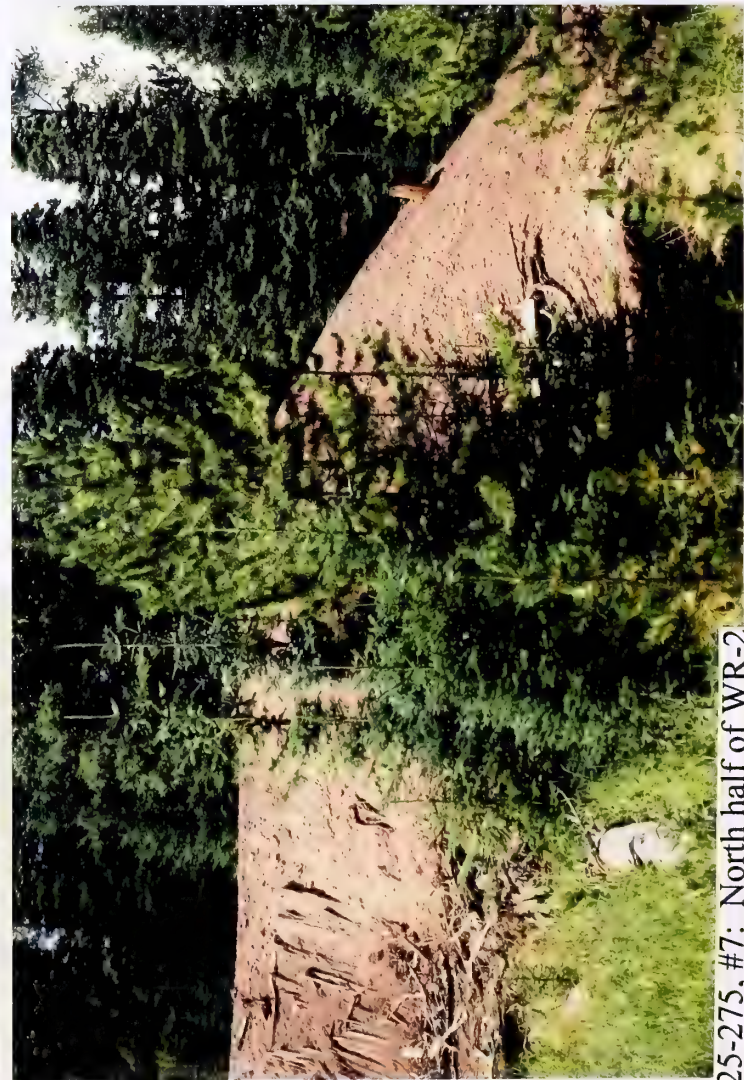
25-275, #3: Discharge ditch and top of WR-1 facing west



25-275, #4: Discharge ditch and top of WR-1 facing east



25-275, #5: Red puddle, salt, and elk tracks on top of WR-1



25-275, #7: North half of WR-2



25-275, #8: Two eastern HMO shafts



25-275, #6: Shaft (HMO), headframe, and south half of WR-2



25-275, #9: Collapsed adit below shaft

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: NATIONAL EXTENSION PA#: 25-287

Date: August 10, 1994 Time: 0945-1300

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Flammang, West; Pioneer

Visitors: Randy Yaeger, MDSL Helicopter Pilot
Russ Gowen, Owner

Weather/Seasonality Observations: Sunny; warm (75°-80°F); calm to slight breeze (2-3 mph); dry, hot summer.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #1: Adit discharge;
#2: East half of WR-1 from below; #3: West end of WR-2 and
discharge from above; #4: West half of WR-1 and stream from below;
#5: East end of WR-2 and discharge from above; #24: Collapsed adit
associated with WR-2, AD-1 sample location; #25: Downgradient SW-
1/SE-1 sample location and WR-2 (background).

Video Tape No. 3

General Comments/Observations (not covered specifically in attached Inventory Forms): N/A

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Contain,
contour, treat/cover dumps, and revegetate. Route adit discharge
and stream around dumps.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): NATIONAL EXTENSION PA#: 25-287

Legal Description: T 8N ; R 5W ; Sec. 10 , SE 1/4 SE 1/4 SW 1/4

County: LEWIS & CLARK Mining District: RIMINI

Latitude: N 46° 27' 12" Longitude: W 112° 12' 34"

Primary Drainage Basin and Code: Tenmile Creek/10030101

Secondary Drainage Basin: Beaver Creek

USGS Quadrangle map name(s): Chessman Reservoir

Mine Type/Commodities: Hardrock/Unknown

Activity Status: Active , Inactive/Exploration , Abandoned X .

Ownership: Known Y X N ; private/public? Private

Owner, Agent, or Contact (Include address and phone when available): Russ Gowen,
395 Griffin Road, Helena, MT 59601.

Relationship to other mines/sites in the area/district: Near
Sallie Bell; 1 mile north of Nellie Grant and Frohner mines

Regulatory Status (Activity by other agencies)? Hardrock permits?
Past Reclamation Activities? N/A

General site features: Elevation 7200' , Slope 15° ,
Aspect North

Land use: Mining X , Recreational X , Residential , Urban ,
Agricultural , Other(Specify)

Area of disturbed/unvegetated lands? 1.1 acre(s) .

Site Dimensions: 300 feet x 150 feet

Predominant vegetation types: Engelmann spruce, Douglas fir,
Lodgepole pine

Access: roads - good (paved) , poor (maintained dirt road) ,
4wd X , trail .

Other logistical considerations (proximity to other sites) . Locked
gate, flew into site

Well logs within 1 mile radius; (Attach MBMG Well Log Printout(s): There are 6 wells reported within a 1 mile radius; 4 wells listed in the MBMG Well Log Database are duplicated.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). Site is underlain by quartz monzonite of the Boulder Batholith; aplite dike through Red Mountain. 0-1.3 miles, unnamed tributary of Beaver Creek (note: flume 0.9 mile down); 1.3-3.8 miles, Beaver Creek; 3.8-15 miles, Tenmile Creek. Mountain alluvial groundwater; numerous springs and shallow alluvium.

Mining/milling history, ore type/tenor, host rock, gangue: No information available. Quartz, pyrite, and galena on dump.

Mine Operation?

Shafts - Yes X, No , # 1, Comment Collapsed with cabin
Adits - Yes X, No , # 2, Comment Both collapsed; 1 dis-charging
Pits - Yes X, No , # , Comment Highwall; adjacent to road
Placers - Yes , No X, # , Comment
Other - Yes , No X, # , Comment

Mill Operation? Yes , No X. If yes answer the next three questions:

Period(s) of Operation: N/A

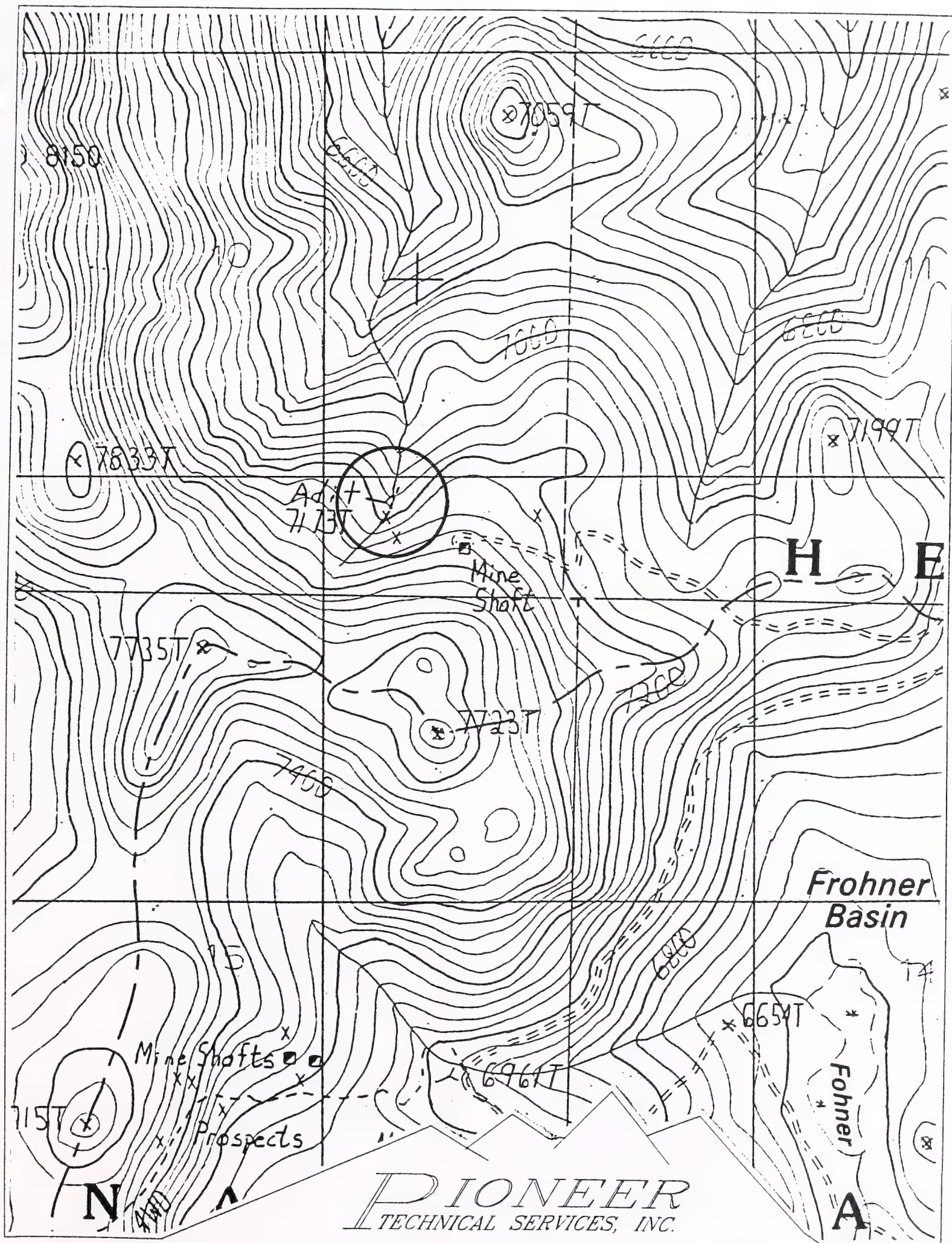
Origin of Ore Milled - Custom Mill Dedicated Mill ; Number and names of mines that supplied mill feed: N/A

Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting?
N/A

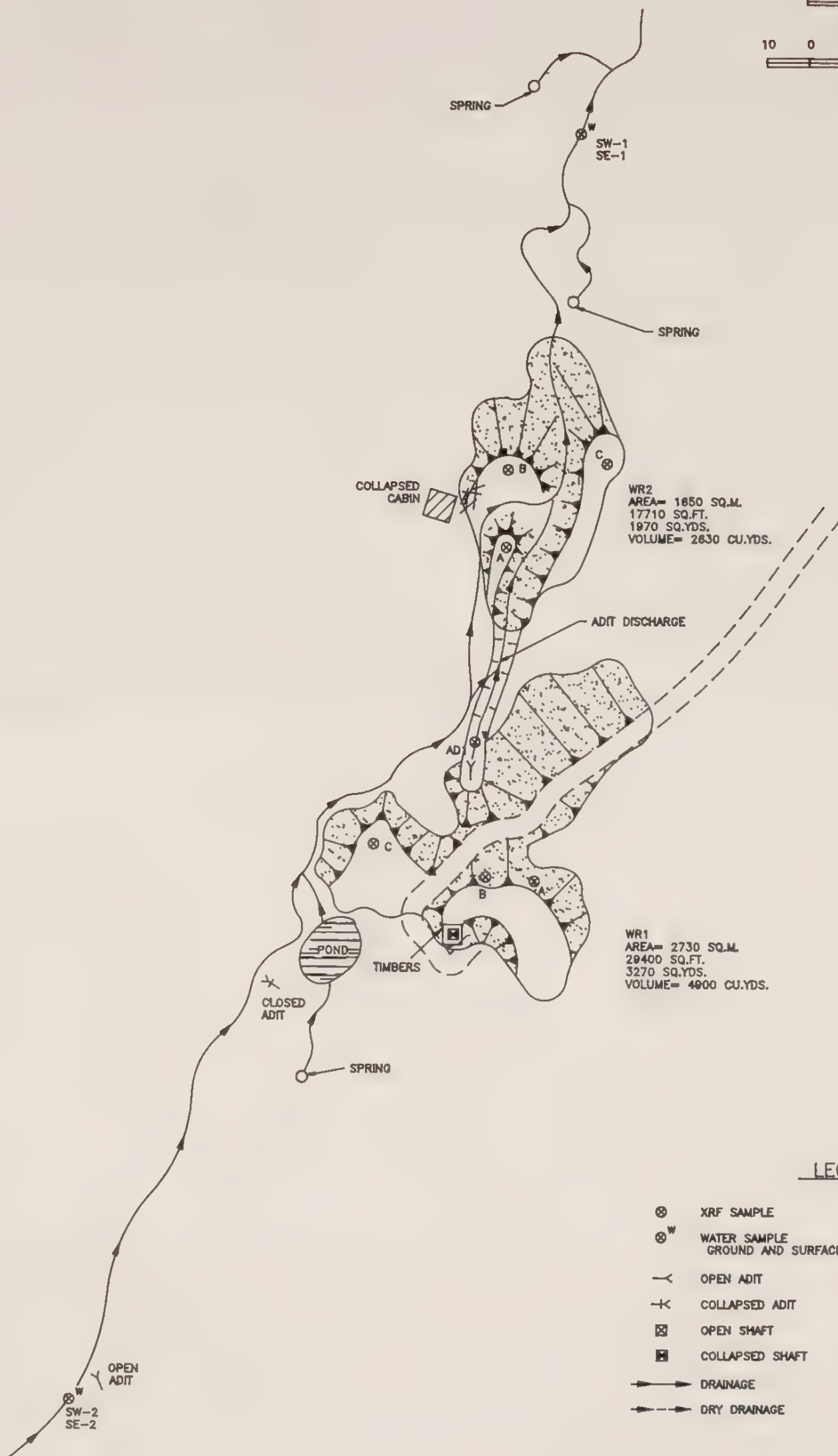
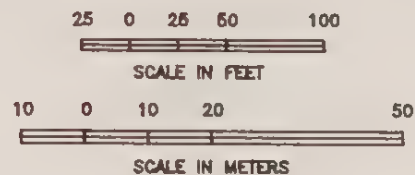
Montana Bureau of Mines and Geology
Water Well Log Data

08/11/1994

Well No.	Location	Depth	Yield	Static Water Level
140618	08N 05W 04 AAA	140.0	10.0	13.00
57341	08N 05W 14 CA	26.0	0.0	6.00
57342	08N 05W 15	355.0	8.0	46.00
57343	08N 05W 15	355.0	8.0	46.00
57344	08N 05W 15 A	220.0	30.0	12.00
58501	08N 05W 15 A	210.0	70.0	5.00
57347	08N 05W 15 A	220.0	30.0	12.00
57345	08N 05W 15 A	212.0	30.0	10.00
58487	08N 05W 15 A	212.0	30.0	10.00
57346	08N 05W 15 A	210.0	70.0	5.00



NATIONAL EXTENSION, P.A. NO. 25-287
T08N, R05W, SECTION 10
SCALE: 1" = 1000'



LEGEND

- | | | | |
|----------------|---------------------------------|-------|----------------------------------|
| ⊗ | XRF SAMPLE | == | IMPROVED ROAD |
| ⊗ ^W | WATER SAMPLE GROUND AND SURFACE | - - - | UNIMPROVED ROAD |
| ↗ | OPEN ADIT | ▨ | STRUCTURE |
| ↘ | COLLAPSED ADIT | ⌵ | COLLAPSED TIMBERS |
| ⊠ | OPEN SHAFT | ⬮ | TAILINGS POND |
| ⊞ | COLLAPSED SHAFT | ⬮ | PONDED WATER |
| → | DRAINAGE | ⬮ | EXCAVATION |
| → | DRY DRAINAGE | ↓ | SLOPE DIRECTION |
| | | ⬮ | WASTE ROCK DUMP OR TAILINGS PILE |

DRAWN FOR:

PIONEER
TECHNICAL SERVICES, INC.

TITLE:

NATIONAL EXTENSION
PA#25-287

DRAWING NO.: PT340238
DATE: 11/19/94

REV: -
PLOT SCALE: 1 = 30

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): N/A

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): N/A

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): N/A

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): N/A

Comments on potential for mitigation: N/A

SOURCE INVENTORY FORM

SAMPLERS: West

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd ³)	LOCATION/DESCRIPTION	CONTAIN- MENT	pH SU (D/S)	RADIO- ACTIVITY (mR/HR)	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
WR-1A	WR	4,900	Upper dump; east side below shaft	None	5.0 (D)	0.03	25-287-WR-1	08/11/94 1615	T-Metals, ABA
WR-1B	WR		Upper dump; center	None	6.0 (D)	0.03			
WR-1C	WR		Upper dump; west side	None	5.2 (D)	0.03			
WR-2A	WR	2,630	Lower dump; center, adjacent to adit	None	4.0 (D)	0.03	25-287-WR-2	08/11/94 1630	T-Metals, ABA
WR-2B	WR		Lower dump; west side, north end	None	< 3.5 (D)	0.03			
WR-2C	WR		Lower dump; east side, north end	None	5.0 (D)	0.04			

b-Direct reading (Galway Meter) ; B-Saturated Paste (Orion Meter)

Comments or deviations from SOPs: 25-287-WR-1 is composite of WR-1A through -1C. 25-287-WR-2 is composite of WR-2A through -2C. See Peerless Jenny/King (25-006) for background soil data.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes X, No , Number: 1 Identification: Adit #1
associated with WR-2

Filled shafts: Yes , No X, Number: Identification:

Seeps/Springs: Yes X, No , Number: 4 Identification: Spring
upgradient of site is headwaters for creek; spring just above feeds
pond; 2 springs adjacent to WR-2

Groundwater wells within 4 miles?: Yes X, No ;
Number of well logs: 51

Distance to nearest well used for drinking:
 <1,000 ft; 1,000 ft to 0.5 miles; X >0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite , Probable , Possible X, Unlikely .

Large, uncontained source may be in contact with shallow alluvial
aquifer. Discharging adit and springs indicates groundwater may be in
contact with metal bearing rock.

Approximate Depth to Groundwater: X <25 ft; 25 - 100 ft; >100 ft.

Other observations/notes: N/A

SAMPLERS: Flammand

Flow: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes X, No , **Name(s):** Unnamed tributary to the Chessman Reservoir flume or Beaver Creek

Dry streambeds: Yes , No X, **Name(s):**

Other surface water: Yes X, No , **Name(s)/Description:** Pond on south side of site; adit discharges to stream

Waste materials within any floodplain: Yes X, No **Source ID(s):** WR-2

Approximate Flood frequency? X 1 yr, 10 yr, 100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? 20 gpm
High Flow: 100 gpm, **Average Flow:** 20 gpm

Distance between waste source(s) and nearest surface water body (ft)?
0 feet between WR-2 and unnamed tributary; 0 feet from WR-1 to tributary; 0 feet between AD-1 discharge and WR-2.

Surface water draining onto or through waste sources: Yes X, No ,
Describe: Discharge from AD-1 flows over WR-2; unnamed tributary cuts across WR-2 on north end

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
The unnamed tributary may flow to a flume, which carries water to Chessman Reservoir and it also flows to Beaver Creek both of which are sources of drinking water to the city of Helena; streamside wetlands, fishery in Beaver Creek/Tenmile Creek.

Observed erosional/sedimentation/stream turbidity problems? Yes X, No . **Distance downstream (ft)?** 0-500 ; 500-1,000 ; >1,000 X.
Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): FEOX precipitate in stream at 1,000 feet sample point; stream still red after confluence with unnamed tributary from west.

SURFACE WATER INVENTORY FORM

SAMPLERS: Flammang

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SAMPLE LOCATION	pH	SC μS/cm @ 25°C	Temp °C	ALK. mg/L as CaCO ₃	Flow* cfs/gpm	LAB. SAMPLE NO.	DATE/ TIME	ANALISES
SW-1	SW	75' downgradient of WR-2	6.33	118	10.3	14	20 gpm (E)	25-287-SW-1	08/10/94 1045	T-Metals, TDS, Hardness, Cl, SO ₄ , NO ₂ /NO ₃
SE-1	SE	75' downgradient of WR-2	N/A	N/A	N/A	N/A	N/A	25-287-SE-1	08/10/94 1045	T-Metals
SW-2	SW	250' above pond about 4' below spring which begins creek	7.78	54	8.3	25	< 1 gpm (E)	25-287-SW-2	08/10/94 1220	T-Metals, TDS, Hardness, Cl, SO ₄ , NO ₂ /NO ₃
SE-2	SE	250' above pond about 4' below spring which begins creek	N/A	N/A	N/A	N/A	N/A	25-287-SE-2	08/10/94 1220	T-Metals
SE-500	SE	Approx. 500' downgradient of SW-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	XRF Analysis
SE-1000	SE	Approx. 1,000' downgradient of SW-1; approx. 50-75' above confluence with stream from west	N/A	N/A	N/A	N/A	N/A	N/A	N/A	XRF Analysis

Flow: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO₃)
Presence of evaporative salt deposits? (ESD)
Discolored or turbid seepage? (SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?
Presence of ferric hydroxide precipitates? (FEOX)
Presence of burned or stressed vegetation? (VEG)
pH \leq 5.0 (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? 2 acres in valley

Wetlands present: Yes X, No , Describe: Small, streamside only

Carbonate rocks/soils: Yes , No X, Describe:

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10 ; 10-30 ; 30-100 X;
100-300 ; 300-1,000 ; 1,000-3,000 ; 3,000-10,000 ; 10,000 or
greater ; Comments

Nearest residence: <1,000 ft; 1,000 ft - 0.5 miles; X >0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: West

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH/MODERATE/LOW/NEAR)
WR-1	FeOx; SO3	Dry	29,400	26,460	Yes	Moderate
WR-2	FeOx; SO3; pH	Dry	17,710	17,710	Yes	Low
AD-1	FeOx	N/A	N/A	N/A	N/A	N/A

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X,
Describe:_____

Population within 1 mile: 1-10 X; 10-30____; 30-100____; 100-300____;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____;
Comments_____

Evidence of recreational use on site: Yes X, No____, Describe: Litter;
campfire rings; stacked firewood, hunting camp.

Accessibility (check each that apply): Easy accessible - no fences,
gates, or warning signs; X Moderately Accessible - barbed wire fences,
road gated, or signs posted; Difficult Access - chain-link fence,
road gated and locked, site guarded (does not include locked or manned
access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment_____
Wilderness Area - Yes____, No X, Comment_____
T&E Species Habitat - Yes____, No X, Comment_____
Bat Habitat - Yes____, No X, Comment_____

Primary Drainage X; Secondary Drainage____; No Information____:

Riparian Habitat Quality - High____, Medium____, Low X

Wetlands Frontage - High____, Medium____, Low X

Fisheries Habitat and Species Classification - 4

Sport Fishery Classification - 4

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes____, No X, Number____, types and locations:_____

Hazardous structures: Yes____, No X, Number____, types and locations:_____

Unstable highwalls, pits, trenches, slopes: Yes X, No____, Number 2,
types and locations: Pit below WR-1 and slope to caved adit

Unstable waste piles, impoundments, undercut banks: Yes____, No X,
Number____, types and locations:_____

Fire and/or Explosion hazards: Yes____, No X, Explain:_____

Bibliography

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0,
Prepared by Montana Natural Resource Information System, December
1989.

MDSL/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for
National Extension, Prepared by Robert Peccia & Associates, July
28, 1988.

USGS, Topographic Map, Chessman Reservoir, Montana, 7 1/2 minute
Quadrangle, 1985.

LABORATORY ANALYTICAL DATA

**NATIONAL EXTENSION
PA NO. 25-287**

National Extension PA# 25-287
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - TUESDAY
INVESTIGATION DATE: 08/10/94

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	Ag (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
25-287-SE1	1.5	486	62.5	14.2	9.6	3.3	293	11900	0.13	3320	2.9 U	991	10.4 UJ	716	NR
25-287-SE2	7.2 U	56.1 U	70.2	6.7 U	14.0 U	11.9	104	3910	0.33	2390	24.1 U	120	86.2 UJ	454	NR
25-287-WR1	58.5	2760	40.7	1.6	1.7 U	2.8	419	22500	10.7	761	3.0 U	12900	28.2 J	380	NR
25-287-WR2	31.1	2820	30.3	0.6	1.2 U	1.0	83.3	13300	3.07	21.7	2.1 U	5790	17.3 J	116	NR
BACKGROUND	0.8 UJX	18.9 J	117	3.5	5.1	1.9	13.5	8300	0.03	1480	4.5	93.2	9.4 UJ	130	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		SULFUR ACID BASE		SULFUR POTENT.		SULFATE SULFUR		PYRITIC SULFUR		ORGANIC SULFUR		PYRITIC SULFUR ACID BASE		SULFUR ACID BASE POTENT.	
	%	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t
25-287-WR1	0.71	22.2	-0.55	-23	0.57	0.02	0.12	0.62	-1.17							
25-287-WR2	0.82	25.6	-3.20	-29	0.33	0.23	0.26	7.19	-10.4							

WATER MATRIX ANALYSES

Metals in Water
Results in ug/L

FIELD ID	Ag	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn (mg CaCO3/L)	HARDNESS CALC.
25-287-AD1	0.29	400	42.4	30.0	8.4 U	6.8 U	173	8300	0.17	2000	14.4 U	395	51.6 U	4490	54.8
25-287-SW1	0.16	45.3	27.2	20.3	8.4 U	6.8 U	76.7	951	0.16	780	14.4 U	91.0	51.6 U	2490	39.9
25-287-SW2	0.12 U	78.8	113	14.6	8.4 U	6.8 U	115	1230	0.29	5840	15.8	80.0	51.6 U	798	109

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Wet Chemistry
Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS		CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
25-287-AD1	43	<5	44	<0.05	NR	
25-287-SW1	68	<5	36	<0.05	NR	
25-287-SW2	<4.0	<5	6.0	<0.05	NR	

LEGEND

SE1 - 75' downgradient of WR2.

SE2 - 250' above pond about 4' below spring which begins creek.

WR1 - Composite of subsamples WR1A, 1B, and 1C.

WR2 - Composite of subsamples WR2A, 2B, and 2C.

BACKGROUND - From the Peerless Kany/Kang Mine (25-406-SS1).

AD1 - Discharge from acid associated with WR2, approx. 6" after

emerging from ground.

SW1 - Same as sample 25-287-SE1.

SW2 - Same as sample 25-287-SE2.

XRF ANALYSIS RESULTS

**NATIONAL EXTENSION
PA NO. 25-287**

Mine Name: National Extension PA# 25-287

XRF Field Analyses

Results in PPM

XRF SAMPLE I.D.	CrHl	K	Ca	Tl	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Sr
25-287-SE1000		13862.1	8468.34	1317.39		7624.54	48237.8			586.641	1700.57	866.038	422.743
25-287-SE500		9719.45	4811.57	774.058		5952.49	40446.4			435.543	1081.25	734.053	373.595
25-287-WR1A		29517.5	1644.01	1270.8		649.945 *	34473.3			437.878 *	618.473	3744.66	89.7904
25-287-WR1A-DUP		29580.6	1499.54	1379.59		844.471	34719.7			508.043	582.727	3572.69	88.9282
25-287-WR1B		14906.1	10153.9	2565.25		1997.08	22452.8				293.907		464.434
25-287-WR1C		20675	3810.1	1357.16		1309.35 *	31321.2			107.995 *	298.929	2245.35	237.766
25-287-WR1-COMP		27083.7	4505.84	1532.89		1324.35 *	34001.1			251.168 *	453.249	2408.21	237.005
25-287-WR2A		34229.4	1645.28	1161.88		867.928 *	28821.1				149.904 *	6699.12	87.1216
25-287-WR2B		38863.2	1898.75	823.944		539.268 *	15966.4			103.475 *	286.224	2783.7	42.3504 *
25-287-WR2C		27412.8	3082.91	1739.05			27285.5				315.383	4336.05	188.584
25-287-WR2-COMP		37933.2	2194.88	1231.79		569.501 *	23602.2				305.807	4367.01	100.373

XRF SAMPLE I.D.	Zr	Hg	Mo	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th
25-287-SE1000	465.588			1092.41	133.546				734.222			19.5962 *
25-287-SE500	164.265			726.601	133.156	161.584 *			674.513			16.8966 *
25-287-WR1A	82.3836		41.5842 *	13812	253.238			75.8938 *	176.466			79.4097 *
25-287-WR1A-DUP	98.6844		30.2712 *	13971.4	237.941			79.5486 *	107.876	110.139 *		43.8673 *
25-287-WR1B	107.005		8.1708 *	235.085	113.55				676.469			17.3829 *
25-287-WR1C	116.145		18.4684 *	4970.43	178.253				454.096			33.4751 *
25-287-WR1-COMP	123.765		18.6693 *	8928.47	194.442				353.908			52.6236 *
25-287-WR2A	113.501		12.282 *	1542.45	266.979				184.374			21.9757 *
25-287-WR2B	95.7717		25.4002 *	8457.88	271.752			105.922 *	94.7578 *			66.9227 *
25-287-WR2C	131.008		20.1284 *	2523.67	213.239			58.9587 *	577.914			28.6435 *
25-287-WR2-COMP	126.885		22.5466 *	4856.03	263.489				233.797			

* = Estimated Quantity

\$ = Unvalidated Data

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**NATIONAL EXTENSION
PA NO. 25-287**

AIMSS SCORESHEET

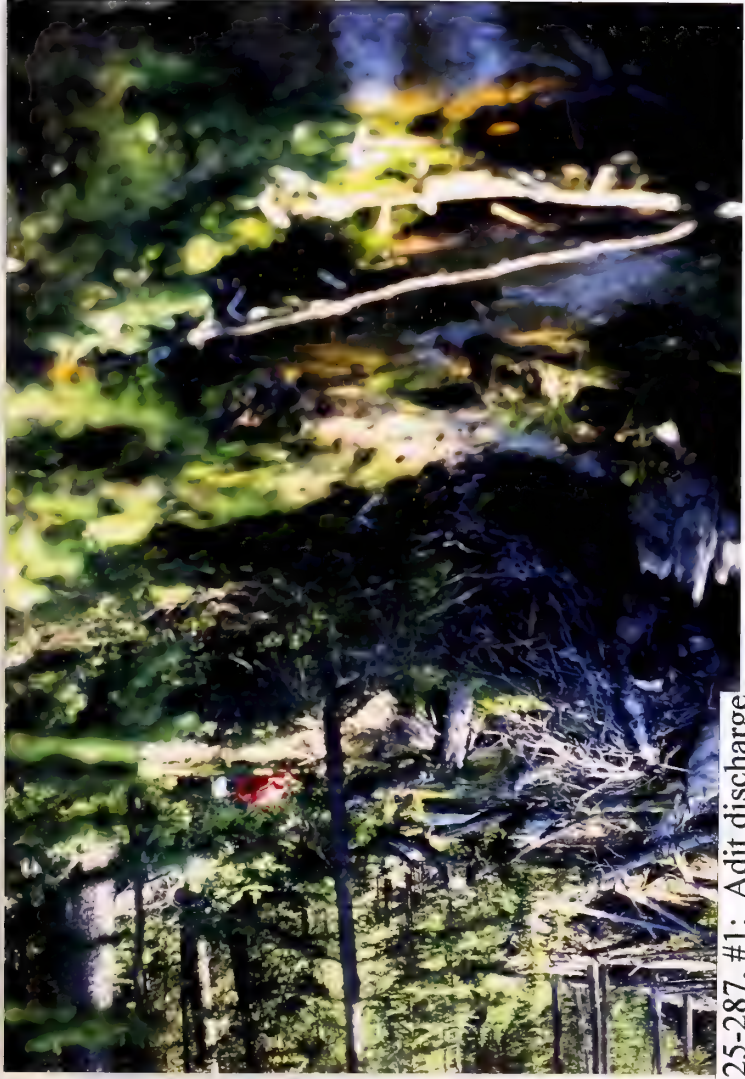
SITE NAME:
PA NUMBER:

National Extension
25-287

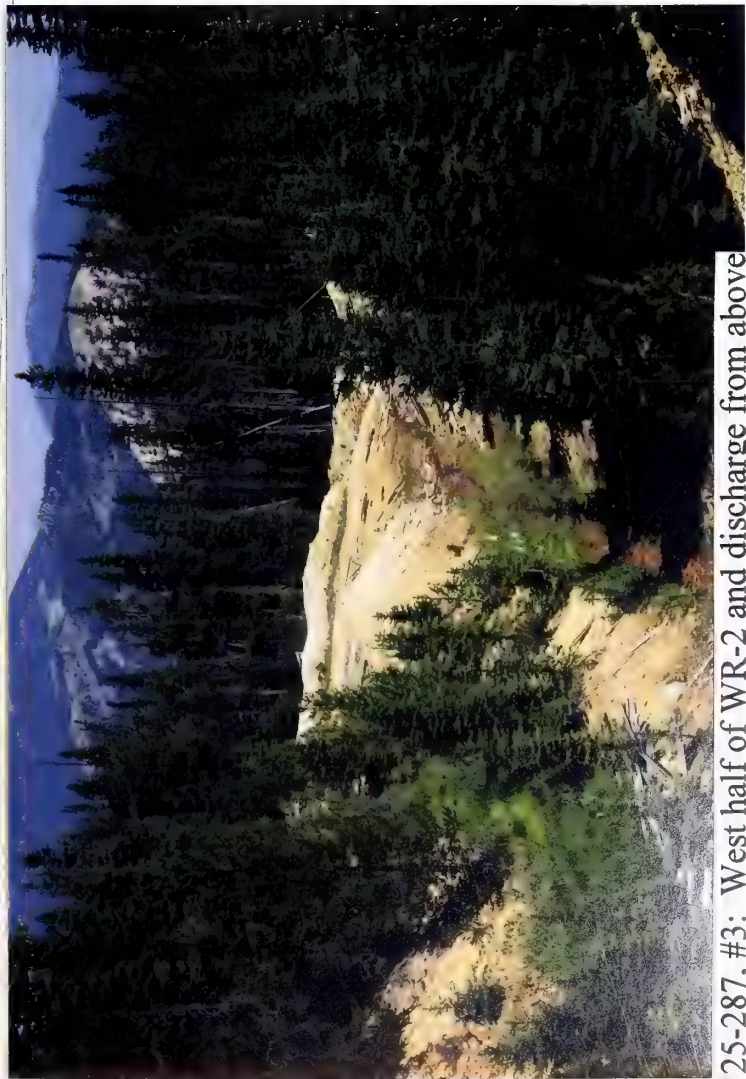
LINE NO.		GROUNDWATER PATHWAY	
1		OBSERVED RELEASE	0
2		EXCEEDENCES	0
3A	GW - LIKELIHOOD	CONTAINMENT	20
3B	OF RELEASE	GW DEPTH	20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
6			64.553
7	GW - TARGETS	WELLS - 1 MI. x 2.5	15.0
8		WELLS - 1 TO 4 MI	45
9		NEAREST WELL	0
10		TARGETS SCORE	LINES 6 + 7 + 8
		GROUNDWATER SCORE	LINES 4 x 5 x 9
			1549272
		SURFACE WATER PATHWAY	
11		OBSERVED RELEASE	300
12	SW - LIKELIHOOD	EXCEEDENCES	50
13A	OF RELEASE	CONTAINMENT	20
13B		DISTANCE TO SW	20
13C		POTENTIAL TO RELEASE	LINES 13A x 13B
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
16			69.925
17		DRINKING WATER POP'N	2450
18		IMPACTED DRAINAGE	1
19	SW - TARGETS	WETLANDS	10
20		FISHERY	1
21		RECREATION	5
22		IRRIGATION/STOCK	0
23		T & E SPECIES HABITAT	0
24		TARGETS SCORE	SUM LINES 16 THRU 22
		SURFACE WATER SCORE	LINES 14 x 15 x 23
			129378731
		AIR PATHWAY	
25		OBSERVED RELEASE	0
26A	AIR - LIKELIHOOD	CONTAINMENT	10
26B	OF RELEASE	DISTANCE TO POPULATION	5
26C		POTENTIAL TO RELEASE	LINES 26A x 26B
27		LIKELIHOOD SCORE	LINES 25 + 26C
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
29			2.607
30		POPULATION - 4 MILES	30
31	AIR - TARGETS	NEAREST RESIDENCE	0
32		WETLANDS	0
33		PARKS / WILDERNESS	0
34		T & E SPECIES HABITAT	0
35		TARGETS SCORE	SUM LINES 29 THRU 33
		AIR PATHWAY SCORE	LINES 27 x 28 x 34
			3911
		DIRECT CONTACT PATHWAY	
36		OBSERVED EXPOSURE	50
37A	LIKELIHOOD OF	ACCESSIBILITY	10
37B	EXPOSURE	DISTANCE TO POPULATION	5
37C		POTENTIAL EXPOSURE	LINES 37A x 37B
38		LIKELIHOOD SCORE	LINES 36 + 37C
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
40			2.409
41	DIRECT CONTACT	POPULATION - 1 MILE	1
42	TARGETS	NEAREST RESIDENCE	0
43		RECREATIONAL USE	10
44		TARGETS SCORE	SUM LINES 40 THRU 42
		DIRECT CONTACT SCORE	LINES 38 x 39 x 43
			2650
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE		
	(LINES 10 + 24 + 35 + 44) / 100,000		1309.35

SITE NAME: National Extension
PA NUMBER: 25-287

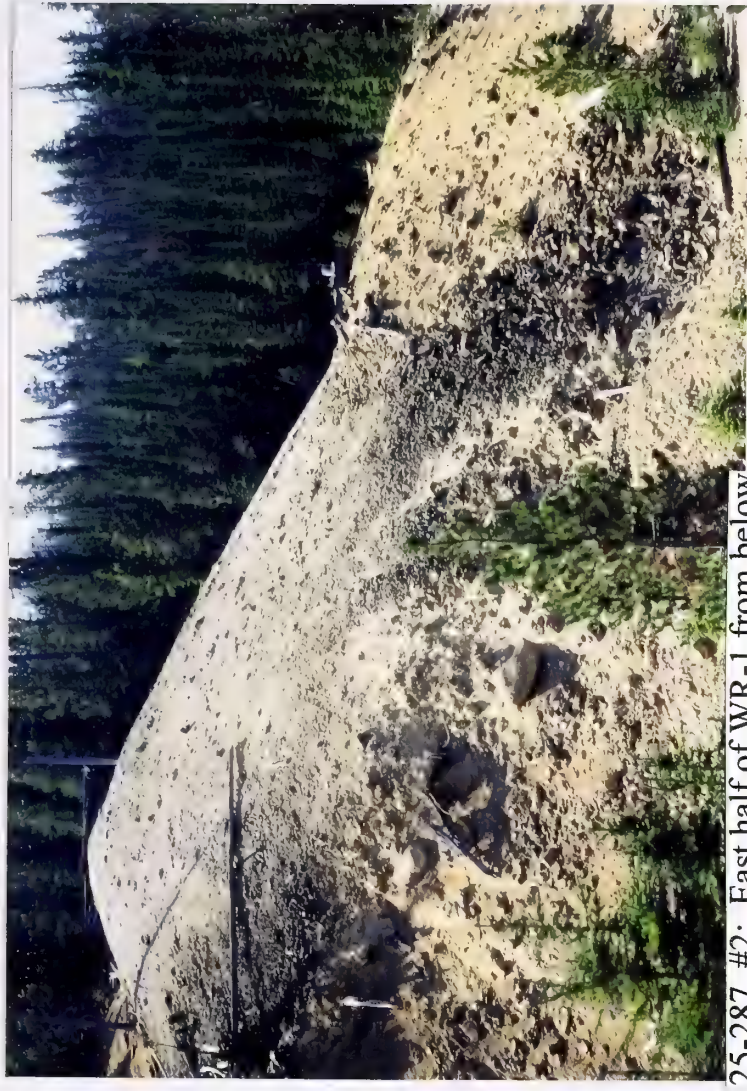
LINE NO.	SITE SAFETY		
1	THREAT	ACCESSIBILITY	10
2		OPEN SHAFTS 100 EA.	0
3		OPEN ADITS 50 EA.	0
4	HAZARDS	UNSTAB. HIWALLS / PITS 75 EA.	150
5		HAZ. STRUCTURES 40 EA.	0
6		EXPLOSIVES	0
7		HAZ. MATERIALS	0
8		HAZARDS SCORE SUM LINES 2 THRU 7	150
9		POPULATION - 1 MILE	1
10	TARGETS	NEAREST RESIDENCE	0
11		RECREATIONAL USE	10
12		TARGETS SCORE SUM LINES 9 THRU 11	11
13		SITE SAFETY SCORE (LINES 1 x 8 x 12) / 1,000	16.50



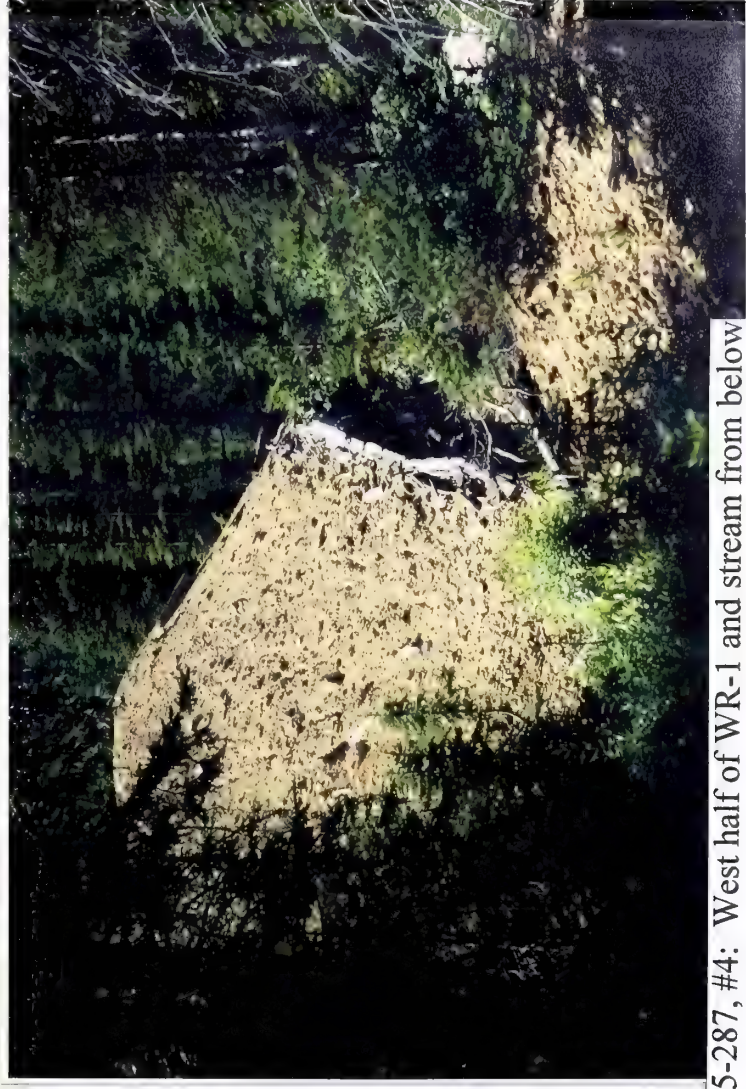
25-287, #1: Adit discharge



25-287, #3: West half of WR-2 and discharge from above



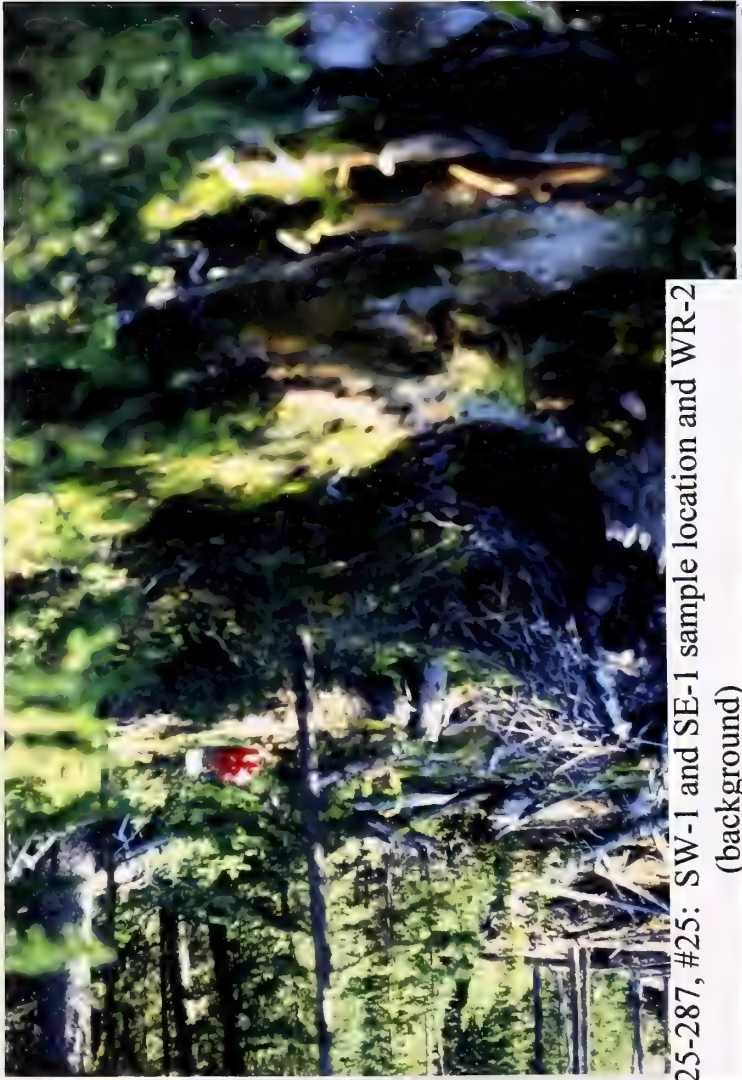
25-287, #2: East half of WR-1 from below



25-287, #4: West half of WR-1 and stream from below



25-287, #5: East half of WR-2 and discharge from above



25-287, #25: SW-1 and SE-1 sample location and WR-2 (background)



25-287, #24: Collapsed adit; AD-1 sample location



MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: MONITOR CREEK TAILINGS PA#: 25-503

Date: August 3, 1994 Time: 0900-1500

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Bisch, Flammang, West; Pioneer

Visitors: Dave Swanson, Geologist for Basin Creek
Mining Co.

Weather/Seasonality Observations: Warm; partly cloudy; slight rain
shower in the afternoon; hot, dry summer; recent rain.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #2: Monitor Creek
and TP-2 facing northeast; #3: Mill building remains; #4: TP-2 and
breached timber/tailings dam; #6: Downgradient SW-3 sample location
in Monitor Creek; #21: Northeast arm of TP-1 facing southwest; #22:
Breached dam facing west; #23: Southeast arm of TP-1 facing south;
#24: Facing west toward west berm (Note: Dead trees along berm).
Video Tape No. 3

General Comments/Observations (not covered specifically in attached Inventory Forms): Site consists of two tailings deposits approximately 1/4 mile
apart. TP-1 is on a divide between Monitor and Tenmile Creeks.
TP-2, to the east of TP-1, is down in the Monitor Creek drainage
and is probably older (1920s); TP-2 is mostly washed away.

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Repair breach
in TP-1 berm, construct runoff/runoff control, apply coversoil, and
revegetate. Move lower tailings (TP-2) out of Monitor Creek
floodplain.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): MONITOR CREEK TAILINGS PA#: 25-503

Legal Description: T 8N ; R 6W ; Sec. 24 , NW 1/4 SE 1/4 1/4

County: LEWIS & CLARK Mining District: RIMINI

Latitude: N 46° 25' 46" Longitude: W 112° 17' 56"

Primary Drainage Basin and Code: Tenmile Creek/10030101

Secondary Drainage Basin: Monitor Creek

USGS Quadrangle map name(s): Three Brothers

Mine Type/Commodities: Millsite/Unknown

Activity Status: Active , Inactive/Exploration , Abandoned X .

Ownership: Known Y X N ; private/public? Private

Owner, Agent, or Contact (Include address and phone when available): Pegasus Gold,
P.O. Box 180, Basin, MT 59631; (406) 494-5904.

Relationship to other mines/sites in the area/district: Adjacent
to Basin Creek mine (active); near Josephine mine; 1 mile west of
Crescent mine.

Regulatory Status (Activity by other agencies)? Hardrock permits?
Past Reclamation Activities? May be included in Basin Creek mine
permit.

General site features: Elevation 7200'-7300', Slope 0-10°,
Aspect North

Land use: Mining X , Recreational X , Residential , Urban ,
Agricultural , Other (Specify)

Area of disturbed/unvegetated lands? Approx. 8 acre(s).

Site Dimensions:

Predominant vegetation types: Lodgepole pine, Douglas fir,
Engelmann spruce, and alder in drainage.

Access: roads - good (paved) , poor (maintained dirt road) ,
4wd X , trail .

Other logistical considerations (proximity to other sites). Upper
pond accessible via Monitor Creek Road or from Basin Creek mine.
Lower pond has no access; 1/4 mile cross-country hike required.

Well logs within 1 mile radius; (Attach MBMG Well Log Printout(s): There are 3
wells reported within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also
note presence of radioactive minerals). TP-1 = 0-500', overland; 500'-1.5 miles -
Tenmile Creek (East Fork); 1.5-15 miles - Tenmile Creek. TP-2 = 0-
2 miles - Monitor Creek; 2-15 miles - Tenmile Creek.

Mining/milling history, ore type/tenor, host rock, gangue: In
1917, a 20-stamp mill replaced an existing 10-stamp mill. This was
later replaced by a 300-ton ball mill. Operated until 1926 when
city of Helena filed a complaint that tailings were polluting it's
water supply (Tenmile Creek). Mill was moved over divide into
Basin Creek drainage. Reported \$2/ton gold. The district is
composed of quartz monzonite, the principal country rock, capped by
rhyolite. Ore deposits occur as veins in quartz monzonite and
mineralized portions of the rhyolite. Gold-bearing rhyolite from
Porphyry Dike mine.

Mine Operation?

Shafts - Yes___, No X, # ____, Comment_____
Adits - Yes___, No X, # ____, Comment_____
Pits - Yes___, No X, # ____, Comment_____
Placers - Yes X, No___, # ____, Comment Piles located in drainage
near TP-2
Other - Yes___, No X, # ____, Comment_____

Mill Operation? Yes X, No____. If yes answer the next three
questions:

Period(s) of Operation: 1914 to 1926

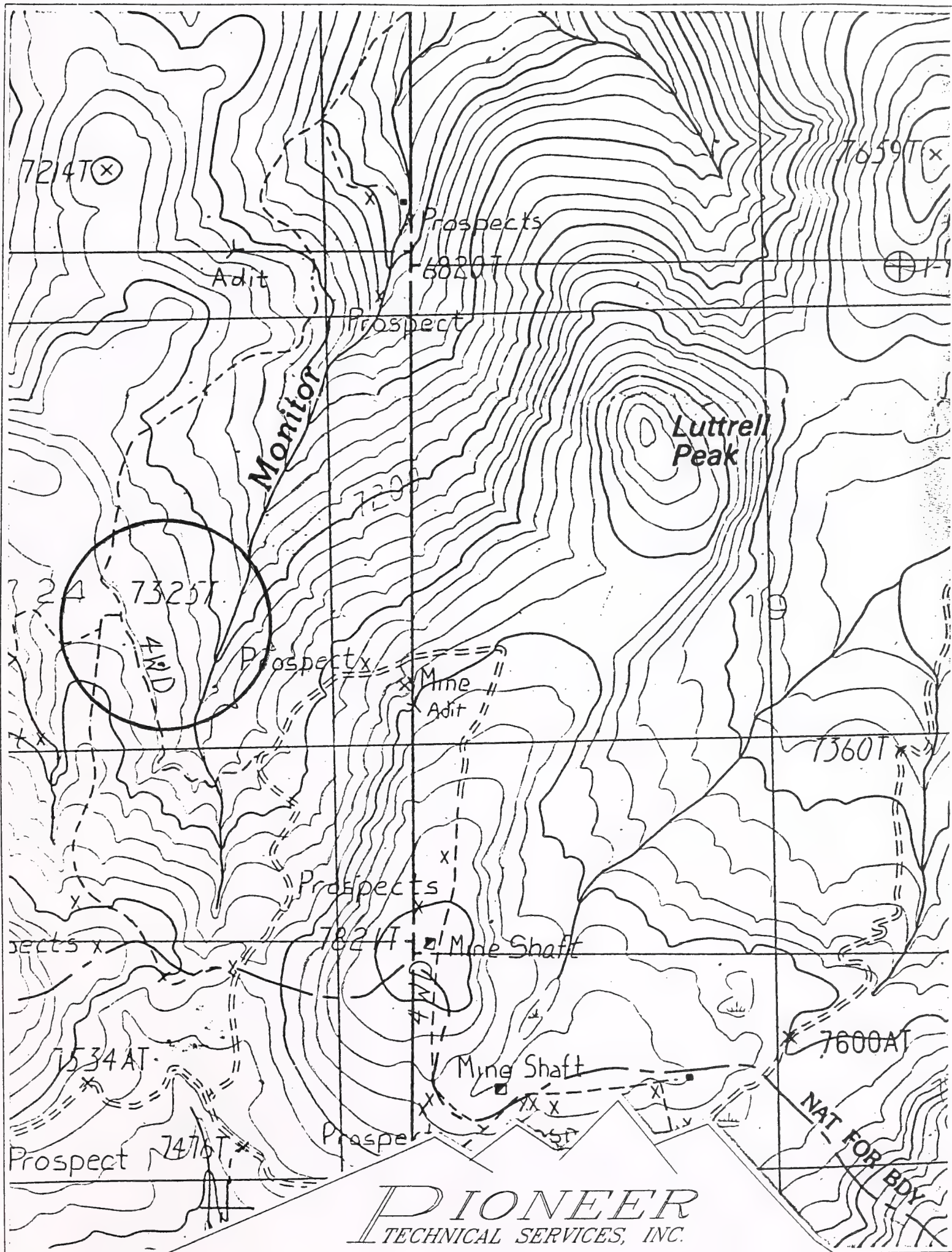
Origin of Ore Milled - Custom Mill___ Dedicated Mill X; Number and
names of mines that supplied mill feed: Porphyry Dike Mine;
possibly Pauper's Dream and Venus.

Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting?
Unknown

Montana Bureau of Mines and Geology
Water Well Log Data

08/11/1994

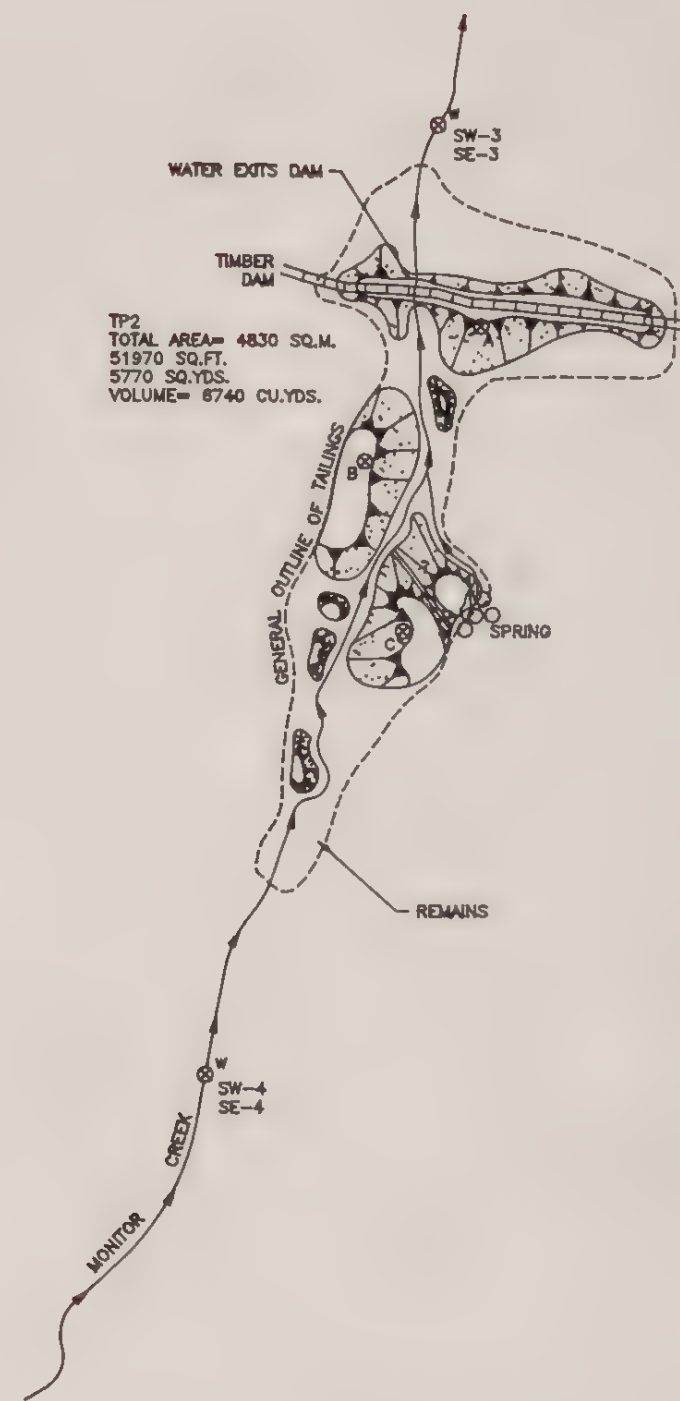
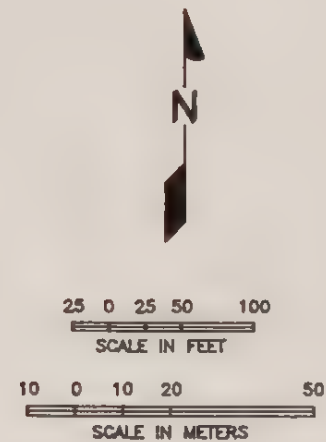
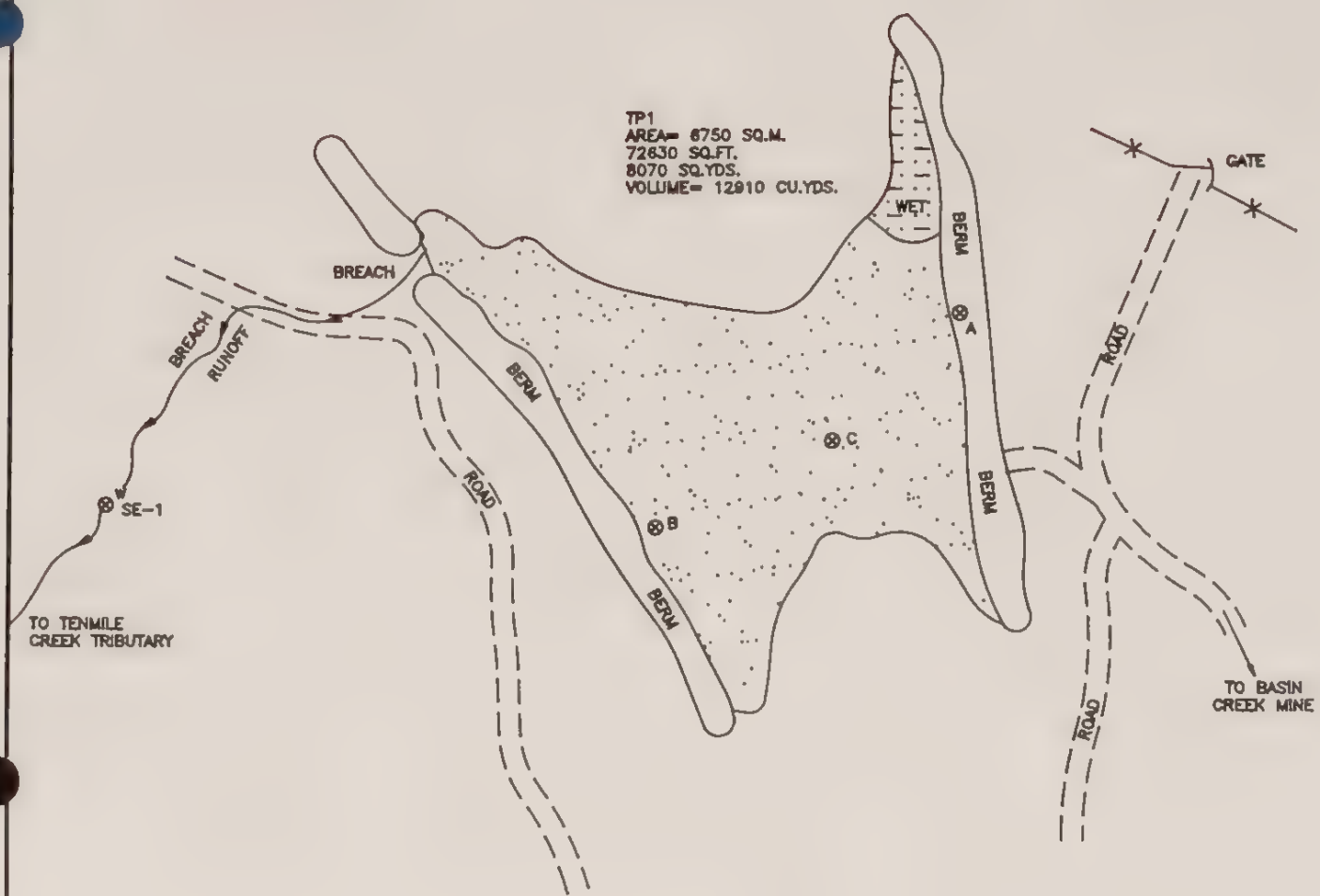
Well No.	Location	Depth	Yield	Static Water Level
57350	08N 06W 25 CA	250.0	80.0	18.00
M:57349	08N 06W 25 CA	100.0	25.0	0.00
M:120003	08N 06W 25 CAC	210.0	15.0	11.00



MONITOR CREEK TAILINGS, P.A. NO. 25-503

T08N, R06W, SECTION 24

SCALE: 1" = 1000'



LEGEND

- | | | | |
|----------------|---------------------------------|-------|----------------------------------|
| ⊗ | XRF SAMPLE | == | IMPROVED ROAD |
| ⊗ ^w | WATER SAMPLE GROUND AND SURFACE | - - - | UNIMPROVED ROAD |
| ∧ | GATE | ▨ | STRUCTURE |
| → | DRAINAGE | ⬮ | TAILINGS POND |
| - - -> | DRY DRAINAGE | ⬮ | SLOPE DIRECTION |
| * * * | FENCE | ⬮ | WASTE ROCK DUMP OR TAILINGS PILE |

DRAWN FOR:

PIONEER
 TECHNICAL SERVICES, INC.

TITLE: UPPER AND LOWER
 MONITOR CREEK TAILINGS
 PA# 25-503

DRAWING NO.: PT340228 REV: -
 DATE: 11/18/94 PLOT SCALE: 1" = 40'

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay):
Both ponds are silty sand size with very little variation.

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): No stratification of color, texture, or composition observed in either impoundment.

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): TP-1 is partly wet where run-off collects. TP-2 is dry.

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): TP-1 is mostly impounded, but breached on west side to Tenmile Creek drainage in one place. TP-2 is no longer impounded at all.

Comments on potential for mitigation: Only a sedimentation problem, amend and revegetate.

SOURCE INVENTORY FORM

SAMPLERS: Tuesday, Bisch, West

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (Yd ³)	LOCATION/DESCRIPTION	CONTAINMENT	PH SU (D/S)*	RADIO-ACTIVITY (MR/HR)	LAB. SAMPLE NO.	DATE/TIME	ANALYSES
TP-1A-1	TAIL	12,910	Upper pond, east side; 0-1.4'	Fair	6.6 (D)	0.055	25-503-TP-1	08/03/94 1800	T-Metals, ABA, Cyanide
TP-1A-2	TAIL		1.4-3.9'	Fair	6.4 (D)	0.055			
TP-1A-3	SOIL		Upper pond, east side; underlying soil	N/A	6.4 (D)	0.05	N/A	N/A	XRF Analysis
TP-1B-1	TAIL		Upper pond, center; 0-2.5'	Fair	6.2 (D)	0.06			
TP-1B-2	TAIL		2.5-3'	Fair	6.4 (D)	0.06			
TP-1C-1	TAIL		Upper pond, west side; 0-4'	Poor	5.8 (D)	0.06			
TP-1C-2	TAIL		4-7.5'	Poor	5.4 (D)	0.06			
TP-1C-3	SOIL		Underlying soil	N/A	6.0 (D)	0.05	N/A	N/A	XRF Analysis
TP-2A-1	TAIL	6,740	Lower pond, north pile; 0-5'	None	6.9 (D)	0.05	25-503-TP-2	08/03/94 1800	T-Metals, ABA, Cyanide
TP-2A-2	TAIL		5-10'	None	6.5 (D)	0.04			
TP-2A-3	TAIL		10-15'	None	6.6 (D)	0.05			
TP-2A-4	TAIL		15-20'	None	6.5 (D)	0.045			
TP-2B-1	TAIL		Lower pond, center pile; 0-5'	None	6.9 (D)	0.055			
TP-2B-2	TAIL		5-10'	None	6.9 (D)	0.06			
TP-2B-3	TAIL		10-15'	None	6.8 (D)	0.065			
TP-2C-1	TAIL		Lower pond, south pile; 0-5'	None	7.2 (D)	0.04			
TP-2C-2	TAIL		5-10'	None	7.1 (D)	0.05			
TP-2C-3	TAIL		10-15'	None	6.6 (D)	0.05			
TP-2C-4	TAIL		15-20'	None	6.3 (D)	0.045			

*Direct reading (slurry meter); 8-Saturated Paste (Orion Meter)

Comments or deviations from SOPs: 25-503-TP-1 is composite of TP-1A-1, -1A-2, -1B-1, -1B-2, -1C-1, and -1C-2. 25-503-TP-2 is composite of TP-2A-1 through -2A-4, -2B-1 through -2B-3, and -2C-1 through -2C-4. See Josephine (22-031) for background soil sample.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes___, No X, Number:___ Identification:_____

Filled shafts: Yes___, No X, Number:___ Identification:_____

Seeps/Springs: Yes X, No___, Number: ? Identification: Several in Monitor Creek drainage

Groundwater wells within 4 miles?: Yes X, No___;

Number of well logs: 24

Distance to nearest well used for drinking:

___<1,000 ft; ___1,000 ft to 0.5 miles; X>0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW); Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter), temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite___, Probable___, Possible X, Unlikely___.

Low metals and good pH in both ponds; however, many dead trees at western edge of TP-1, possibly due to groundwater contamination.

Approximate Depth to Groundwater: X<25 ft; ___ 25 - 100 ft; ___ >100 ft.

Other observations/notes: Shallow groundwater at TP-2 in Monitor Creek drainage; deeper at TP-1 on divide.

SAMPLERS:

[illegible]

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes X, No , Name(s): Monitor Creek

Dry streambeds: Yes X, No , Name(s): Tributary of East Fork of Tenmile Creek

Other surface water: Yes , No X, Name(s)/Description:

Waste materials within any floodplain: Yes X, No Source ID(s): TP-2 in Monitor Creek floodplain.

Approximate Flood frequency? X 1 yr, 10 yr, 100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? 0.3 cfs

High Flow: 5 cfs, Average Flow: 0.5 cfs

Distance between waste source(s) and nearest surface water body (ft)? 0 feet

Surface water draining onto or through waste sources: Yes X, No , Describe: Monitor Creek flows through TP-2.

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?) Monitor Creek is a tributary to Tenmile Creek, which is a source of drinking water for Helena; fishery, wetlands, T&E habitat for Bald Eagle and Peregrine Falcon.

Observed erosional/sedimentation/stream turbidity problems? Yes X, No . Distance downstream (ft)? 0-500 ; 500-1,000 ; >1,000 X. Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): Tailings in Monitor Creek 5,000 feet downstream.

SURFACE WATER INVENTORY FORM

SAMPLERS: Tuesday, Flammang

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SAMPLE LOCATION	pH SU	SC $\mu\text{S}/\text{cm}$ @ 25°C	Temp °C	ALK. mg/L as CaCO_3	Flow' cfs/gpm	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
SE-1	SE	Downstream sediment in Tenmile Creek tributary west of TP-1 where breach drains to Tenmile Creek	N/A	N/A	N/A	N/A	N/A	25-503-SE-1	08/03/94 1100	T-Metals
SW-3	SW	Downstream of TP-2 in Monitor Creek	4.47	128	16.9	0	0.3 cfs (E)	25-503-SW-3	08/03/94 1200	T-Metals, TDS, Hardness, Cl, SO ₄ , NO ₂ /NO ₃
SE-3	SE	Downstream of TP-2 in Monitor Creek	N/A	N/A	N/A	N/A	N/A	25-503-SE-3	08/03/94 1200	T-Metals
SW-4	SW	Upstream of TP-2 in Monitor Creek, downstream of waste rock workings	4.37	117	16.4	0	0.3 cfs (E)	25-503-SW-4	08/03/94 1230	T-Metals, TDS, Hardness, Cl, SO ₄ , NO ₂ /NO ₃
SE-4	SE	Upstream of TP-2 in Monitor Creek, downstream of waste rock workings	N/A	N/A	N/A	N/A	N/A	25-503-SE-4	08/03/94 1230	T-Metals
TSE-500	SE	500' downstream in Tenmile Creek tributary from SE-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	XRF Analysis
MSE-500	SE	500' downstream in Monitor Creek from SE-3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	XRF Analysis
MSE-1000	SE	1,000' downstream in Monitor Creek from SE-3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	XRF Analysis

FLOW: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO₃)
Presence of evaporative salt deposits? (ESD)
Discolored or turbid seepage? (SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?
Presence of ferric hydroxide precipitates? (FEOX)
Presence of burned or stressed vegetation? (VEG)
pH ≤ 5.0 (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? 3 acres on-site at TP-1; 2 acres west of creek at TP-2.

Wetlands present: Yes___, No X, Describe:_____

Carbonate rocks/soils: Yes___, No X, Describe:_____

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10___; 10-30 X; 30-100___; 100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or greater___; Comments_____

Nearest residence: ___<1,000 ft; ___1,000 ft - 0.5 miles; X>0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Tuesday, Bisch, West

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH/MODERATE/LOW/NONE)
TP-1	FE0X; VEG	Partial	72,630	65,370	Yes	Moderate
TP-2	FE0X; VEG	Dry	51,970	51,970	Yes	Moderate

Notes and Clarifications: Dead trees west (downgradient) of TP-1.

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X,
Describe:_____

Population within 1 mile: 1-10 X; 10-30____; 30-100____; 100-300____;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____;
Comments_____

Evidence of recreational use on site: Yes____, No X, Describe:_____

Accessibility (check each that apply): Easily accessible - no fences,
gates, or warning signs; X Moderately Accessible - barbed wire fences,
road gated, or signs posted; Difficult Access - chain-link fence,
road gated and locked, site guarded (does not include locked or manned
access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment_____

Wilderness Area - Yes____, No X, Comment_____

T&E Species Habitat - Yes X, No____, Comment Bald Eagle, Peregrine
Falcon

Bat Habitat - Yes____, No X, Comment_____

Primary Drainage X; Secondary Drainage____; No Information____:

Riparian Habitat Quality - High____, Medium____, Low X

Wetlands Frontage - High____, Medium____, Low X

Fisheries Habitat and Species Classification - 4

Sport Fishery Classification - 4

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes____, No X, Number____, types and locations:_____

Hazardous structures: Yes____, No X, Number____, types and locations:_____

Unstable highwalls, pits, trenches, slopes: Yes____, No X, Number____,
types and locations:_____

Unstable waste piles, impoundments, undercut banks: Yes X, No____,
Number 1, types and locations: TP-2 is undercut by Monitor Creek.

Fire and/or Explosion hazards: Yes____, No X, Explain:_____

Bibliography

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0,
Prepared by Montana Natural Resource Information System, December
1989.

USGS, Topographic Map, Three Brothers, Montana, 7 1/2 minute Quadrangle,
1985.

LABORATORY ANALYTICAL DATA

**MONITOR CREEK TAILINGS
PA NO. 25-503**

Monitor Creek Tailings PA# 25-503
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - TUESDAY
INVESTIGATION DATE: 08/03/94

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	Ag (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
25-503-SE1	3.4 J	30.2	12.3	0.9 U	2.4 J	1.5 U	11.8	10100	1.00	236 JX	3.4	63.2	11.5 UJ	28.2	NR
25-503-SE3	4.2 J	9.6	2.6	0.9 U	1.8 UJ	1.5 U	3.1	3810	0.23	5.6 JX	3.2 U	28.9	11.3 UJ	7.6	NR
25-503-SE4	1.4 J	9.0 U	10.1	1.3	2.2 UJ	1.8 U	6.7	7090	0.08	9.4 JX	3.9 U	50.9	13.8 UJ	12.7	NR
25-503-TP1	4.8 J	15.2	11.4	0.8 U	1.8 UJ	1.4 U	6.2	9250	1.79	18.0 JX	3.0 U	51.9	10.8 UJ	17.9	<0.275
25-503-TP2	4.9 J	7.4 U	4.9	0.9 U	1.8 UJ	1.5 U	4.1	4750	0.38	3.3 JX	3.2 U	35.9	11.3 UJ	7.4	<0.275
BACKGROUND	1.0 U	84.1 J	67.8 J	1.0 UJ	2.5	2.5 J	55.9	7500 JX	0.24 JX	442 J	3.5 U	53.3	12.5 UJ	57.6	

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	ACID BASE POTENT. v/1000t	NEUTRAL. POTENT. v/1000t	SULFUR ACID BASE POTENT. v/1000t	ORGANIC SULFUR %	PYRITIC SULFUR v/1000t	ACID BASE POTENT. v/1000t
25-503-TP1	0.02	0.62	1.22	0.59	<0.01	0.00	1.22
25-503-TP2	0.01	0.31	0.03	-0.3	<0.01	0.00	0.03

WATER MATRIX ANALYSES

Metals in Water
Results in ug/L

FIELD ID	Ag	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
25-503-SW3	0.12 U	1.1 U	29.5	4.0 U	8.4 U	6.8 U	7.4	857	0.17 JX	183	14.4 U	12.2	51.6 U	204	26.5
25-503-SW4	0.12 U	1.1 U	28.2	4.9	8.4 U	6.8 U	9.6	687	0.08 JX	136	14.4 U	10.5	51.6 U	209	17.8

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Wet Chemistry
Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
25-503-SW3	67	<5.0	35	0.05	NR
25-503-SW4	58	<5.0	33	0.09	NR

LEGEND

SE1 - Downstream sed. in Tennessee rd. west of TP1 where beach drains to Tennessee Crk.
SE3 - Downstream of TP2 in Monitor Creek.
SE4 - Upstream of TP2 in Monitor Creek, downstream of waste rock workings.
TP1 - Composite of TP1A-1, 1A-2, 1B-1, 1B-2, 1C-1, and 1C-2.
TP2 - Composite of TP2A-1 through 2A-4, 2B-1 through 2B-3, and 2C-1 through 2C-4.
BACKGROUND - From the Josephine Mine (22-031-SS1).
SW3 - Same as sample 25-503-SE3.
SW4 - Same as sample 25-503-SE4.

XRF ANALYSIS RESULTS

**MONITOR CREEK TAILINGS
PA NO. 25-503**

XRF Field Analyses
Results in PPM

XRF SAMPLE I.D.	CrHl	K	Ca	Ti	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Sr
25-503-MSE1000		31381.4	1499.93	389.247 *			5324.88					65.2378 *	62.8304
25-503-MSE500		26385.1	1296.84				4855.53						50.369
25-503-TP1A1		47454.2	2915.47	153.15 *			9144.73					78.6581 *	31.3701 *
25-503-TP1A2		52823.1	2452.48	316.379 *			10699.4					76.831 *	36.3752 *
25-503-TP1A3		36643	3418.32	881.643			14707.6				72.4025 *	61.8975 *	241.479
25-503-TP1B1		55405.6	2210.43				9201.25					72.0664 *	31.8325 *
25-503-TP1B2		21050.6	2516.2	1660.13	203.126 *		8864.95				80.0683 *	64.7884 *	108.037
25-503-TP1C1		57204.9	2875.93	136.797 *			8403.23					63.0162 *	22.2105 *
25-503-TP1C2		55406.4	2500.71				7901.92		167.046 *			62.5672 *	34.004 *
25-503-TP1C3		36654.1	3410.41	1370.16			16338.6				101.563 *	93.2926 *	201.28
25-503-TP1-COMP		50460.4	3165.89	529.097 *			9439.69					90.7626 *	52.2388
25-503-TP2A1		44659.5	1463.62				5940.38				76.0703 *	81.2861 *	35.2526
25-503-TP2A2		37926.8	1225.96		284.082 *		5867.83					50.7153 *	39.3667
25-503-TP2A3		30251.8	1557.43		660.168 *		4549.74					82.9082 *	26.1955 *
25-503-TP2A4		31949.9	2677.46		228.603 *		3656.5					43.1797 *	35.9036
25-503-TP2B1		42074.3	1809.98				4870.53				57.6532 *		20.8585 *
25-503-TP2B2		37102.7	1866.81		452.017 *		5022.99						32.6815 *
25-503-TP2B3		40154.2	2067.63				5347.58					42.3414 *	31.5816 *
25-503-TP2C1		41362.7	1836.91				5108.71					64.8326 *	26.2199 *
25-503-TP2C2		32513.5	1443.56				5003.03					65.2759 *	37.6467
25-503-TP2C3		44707.1	1609.25	137.64 *			4478.46				63.1725 *	63.8741 *	21.3474 *
25-503-TP2C4		33236.2	1224.03		224.42 *		3600.71					70.2206 *	25.0698 *
25-503-TP2-COMP		38131.5	1606.94		174.305 *		5434.08					87.5587 *	47.4587
25-503-TSE500		69804.2	2588.81	336.548 *			10079.5						

XRF SAMPLE I.D.	Zr	Hg	Mo	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th
25-503-MSE1000	146.389				242.112				149.136	78.4363 *	63.5792 *	46.0257
25-503-MSE500	123.66				236.405				98.923 *	82.9738 *	51.2003 *	54.3629
25-503-TP1A1	139.423				505.003						55.5397 *	66.1279
25-503-TP1A2	141.409			38.8492 *	421.998						71.5013 *	72.3987
25-503-TP1A3	160.375				310.777				475.42			28.3474 *
25-503-TP1B1	131.774				466.503						71.5671 *	59.1211
25-503-TP1B2	254.635				197.4						48.8718 *	41.6381 *
25-503-TP1C1	117.133				492.758				217.641		63.3543 *	70.9291
25-503-TP1C2	125.166				447.188						65.1118 *	67.4891
25-503-TP1C3	214.441				289.11						36.5082 *	34.4057 *
25-503-TP1-COMP	158.359				411.003				618.444		85.1886 *	69.642
25-503-TP2A1	130.795				350.825				64.9113 *		71.3336 *	55.843
25-503-TP2A2	132.976				290.601						66.9544 *	55.935
25-503-TP2A3	110.338				252.417						63.1341 *	56.74
25-503-TP2A4	117.504				226.123						73.1895 *	56.0224
25-503-TP2B1	105.339				328.574						64.1978 *	62.5526
25-503-TP2B2	102.665				324.958						74.3292 *	61.8831
25-503-TP2B3	99.2045				370.729						64.116 *	74.5217
25-503-TP2C1	104.315				376.759						56.6456 *	56.344
25-503-TP2C2	94.6808				315.987						62.8063 *	55.5213
25-503-TP2C3	109.018				394.608						59.7653 *	53.5275
25-503-TP2C4	100.088				303.109						57.7278 *	61.6119
25-503-TP2-COMP	113.333				326.48						66.3945 *	
25-503-TSE500	137.326				550.276						66.7269 *	79.0151

* = Estimated Quantity

\$ = Unvalidated Data

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**MONITOR CREEK TAILINGS
PA NO. 25-503**

AIMSS SCORESHEET

SITE NAME: Monitor Creek Tailings
PA NUMBER: 25-503

LINE NO.		GROUNDWATER PATHWAY	
1		OBSERVED RELEASE	0
2		EXCEEDENCES	0
3A	GW - LIKELIHOOD OF RELEASE	CONTAINMENT	20
3B		GW DEPTH	20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B 400
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C 400
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 0.016
6	GW - TARGETS	WELLS - 1 MI. x 2.5	7.5
7		WELLS - 1 TO 4 MI	21
8		NEAREST WELL	0
9		TARGETS SCORE	LINES 6 + 7 + 8 28.5
10		GROUNDWATER SCORE	LINES 4 x 5 x 9 182
		SURFACE WATER PATHWAY	
11		OBSERVED RELEASE	300
12	SW - LIKELIHOOD OF RELEASE	EXCEEDENCES	0
13A		CONTAINMENT	20
13B		DISTANCE TO SW	20
13C		POTENTIAL TO RELEASE	LINES 13A x 13B 400
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C 700
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 0.099
16	SW - TARGETS	DRINKING WATER POP'N	2450
17		IMPACTED DRAINAGE	5
18		WETLANDS	10
19		FISHERY	1
20		RECREATION	5
21		IRRIGATION/STOCK	2
22		T & E SPECIES HABITAT	5
23		TARGETS SCORE	SUM LINES 16 THRU 22 2478
24		SURFACE WATER SCORE	LINES 14 x 15 x 23 171725
		AIR PATHWAY	
25		OBSERVED RELEASE	0
26A	AIR - LIKELIHOOD OF RELEASE	CONTAINMENT	10
26B		DISTANCE TO POPULATION	5
26C		POTENTIAL TO RELEASE	LINES 26A x 26B 50
27		LIKELIHOOD SCORE	LINES 25 + 26C 50
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 0.001
29	AIR - TARGETS	POPULATION - 4 MILES	10
30		NEAREST RESIDENCE	0
31		WETLANDS	0
32		PARKS / WILDERNESS	0
33		T & E SPECIES HABITAT	5
34		TARGETS SCORE	SUM LINES 29 THRU 33 15
35		AIR PATHWAY SCORE	LINES 27 x 28 x 34 1
		DIRECT CONTACT PATHWAY	
36		OBSERVED EXPOSURE	0
37A	LIKELIHOOD OF EXPOSURE	ACCESSIBILITY	10
37B		DISTANCE TO POPULATION	5
37C		POTENTIAL EXPOSURE	LINES 37A x 37B 50
38		LIKELIHOOD SCORE	LINES 36 + 37C 50
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 0.000
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE	1
41		NEAREST RESIDENCE	0
42		RECREATIONAL USE	0
43		TARGETS SCORE	SUM LINES 40 THRU 42 1
44		DIRECT CONTACT SCORE	LINES 38 x 39 x 43 0
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE (LINES 10 + 24 + 35 + 44) / 100,000		1.72

SITE NAME: Monitor Creek Tailings
 PA NUMBER: 25-503

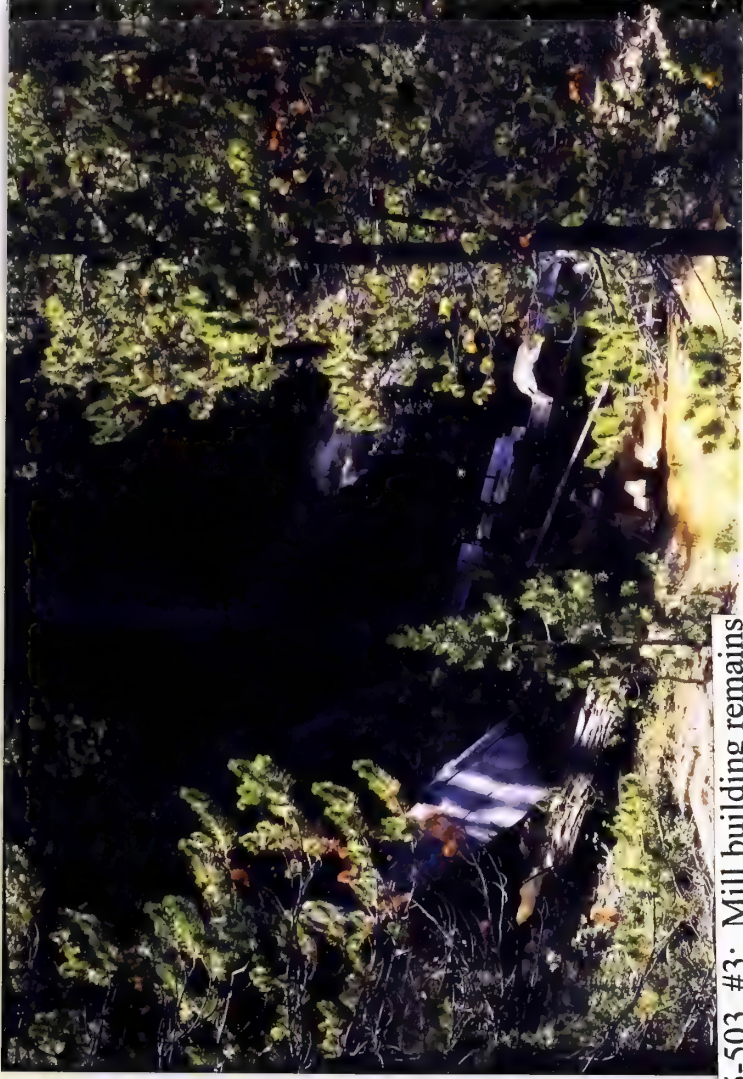
LINE
NO.

SITE SAFETY

1	THREAT	ACCESSIBILITY		10
2		OPEN SHAFTS	100 EA.	0
3		OPEN ADITS	50 EA.	0
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	75
5		HAZ. STRUCTURES	40 EA.	0
6		EXPLOSIVES		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 THRU 7	75
9		POPULATION - 1 MILE		1
10	TARGETS	NEAREST RESIDENCE		0
11		RECREATIONAL USE		0
12		TARGETS SCORE	SUM LINES 9 THRU 11	1
13		SITE SAFETY SCORE	(LINES 1 x 8 x 12) / 1,000	0.75



25-503, #2: Monitor Creek and TP-2 facing northeast



25-503, #3: Mill building remains



25-503, #4: TP-2 and breached timber/tailings dam



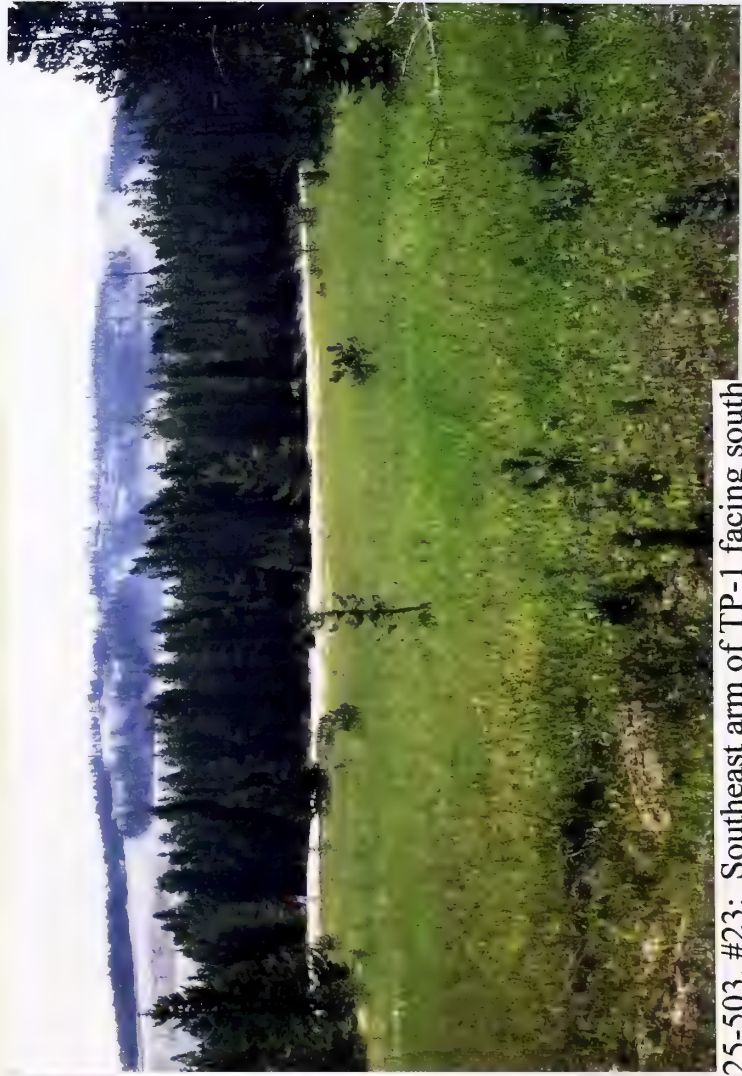
25-503, #6: SW-3 sample location,



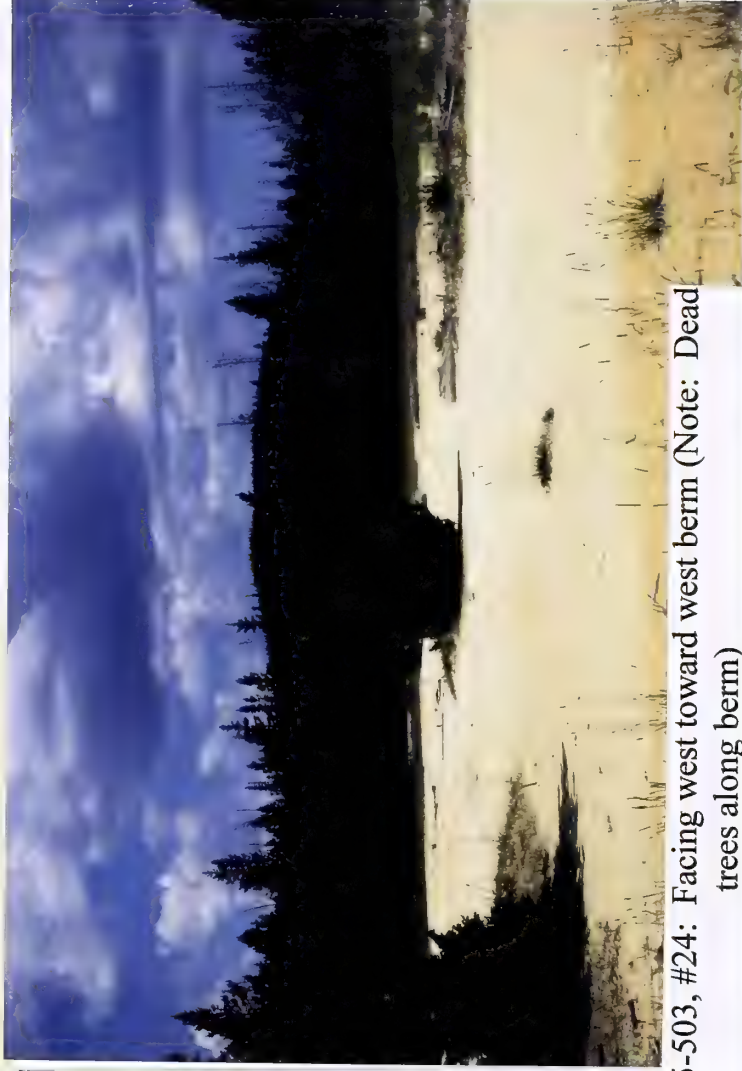
25-503, #21: Northeast arm of TP-1 facing southwest



25-503, #22: Breached dam facing west



25-503, #23: Southeast arm of TP-1 facing south



25-503, #24: Facing west toward west berm (Note: Dead trees along berm)

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: BEAR GULCH PA#: 25-504

Date: August 16, 1994 Time: 1000-1330

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Bisch, West; Pioneer

Visitors: None; contacted owner of property to
access road (Mary Tipton)

Weather/Seasonality Observations: Clear, warm, dry; hot, dry
summer.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #26: Adit discharge
and small opening, AD-1 sample location; #27: Top of WR-1 from
west; #28: South side of WR-1 from west. Video Tape No. 3

General Comments/Observations (not covered specifically in attached Inventory Forms): Site is otherwise known as the White Rabbit Mine. Claim notice
dated 08/10/93, read "White Rabbit Claim - Mike Tipton."

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Route
discharge better to avoid dump; revegetate.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): BEAR GULCH PA#: 25-504

Legal Description: T 9N ; R 5W ; Sec. 17 , NW 1/4 NE 1/4 NW 1/4

County: LEWIS & CLARK Mining District: RIMINI

Latitude: N 46° 32' 32" Longitude: W 112° 15' 43"

Primary Drainage Basin and Code: Tenmile Creek/10030101

Secondary Drainage Basin: Bear Gulch

USGS Quadrangle map name(s): MacDonald Pass

Mine Type/Commodities: Hardrock/Gold

Activity Status: Active , Inactive/Exploration , Abandoned X .

Ownership: Known Y X N ; private/public? Private

Owner, Agent, or Contact (Include address and phone when available): Mike Tipton

Relationship to other mines/sites in the area/district: Shaft uphill to northwest may be related to the mine.

Regulatory Status (Activity by other agencies)? Hardrock permits?
Past Reclamation Activities? N/A

General site features: Elevation 5400' , Slope 15° ,
Aspect Southeast

Land use: Mining X , Recreational X , Residential X , Urban ,
Agricultural , Other (Specify)

Area of disturbed/unvegetated lands? 1 acre(s) .

Site Dimensions: 300 feet x 100 feet

Predominant vegetation types: Lodgepole pine, alder, aspen, juniper

Access: roads - good (paved) , poor (maintained dirt road) ,
4wd X , trail .

Other logistical considerations (proximity to other sites). Must access site through gate at 1968 Rimini Road.

Well logs within 1 mile radius; (Attach MBMG Well Log Printout(s)): There are 8 wells reported within a 1 mile radius; Tipton residence at base of Bear Gulch has a well.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). Site is underlain by quartz monzonite of the Boulder Batholith and basic volcanic dikes. Site lies 50 feet from Bear Gulch, which flows east 1 mile to confluence with Tenmile Creek. Tenmile Creek flows north from there.

Mining/milling history, ore type/tenor, host rock, gangue: Mine was last worked in the early 1980s. Host rock is quartz monzonite, calcic volcanics on dump; gangue is quartz (vein?) on dump.

Mine Operation?

Shafts - Yes X, No , # 1, Comment Did not investigate
Adits - Yes X, No , # 1, Comment Discharge; caved
Pits - Yes , No X, # , Comment
Placers - Yes , No X, # , Comment
Other - Yes X, No , # ?, Comment Several prospects

Mill Operation? Yes , No X. If yes answer the next three questions:

Period(s) of Operation: N/A

Origin of Ore Milled - Custom Mill Dedicated Mill ; Number and names of mines that supplied mill feed: N/A

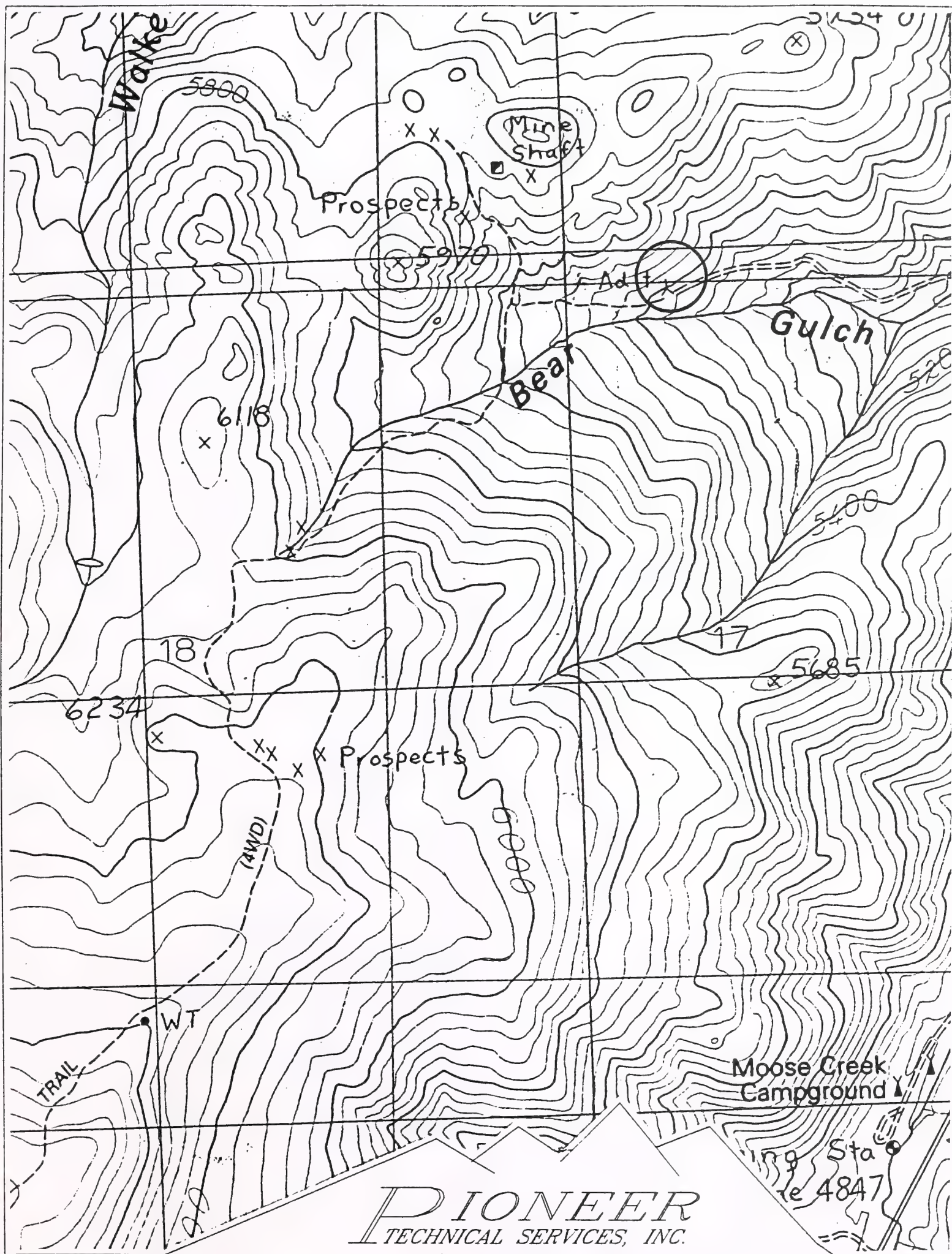
Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting?
N/A

Montana Bureau of Mines and Geology
Water Well Log Data

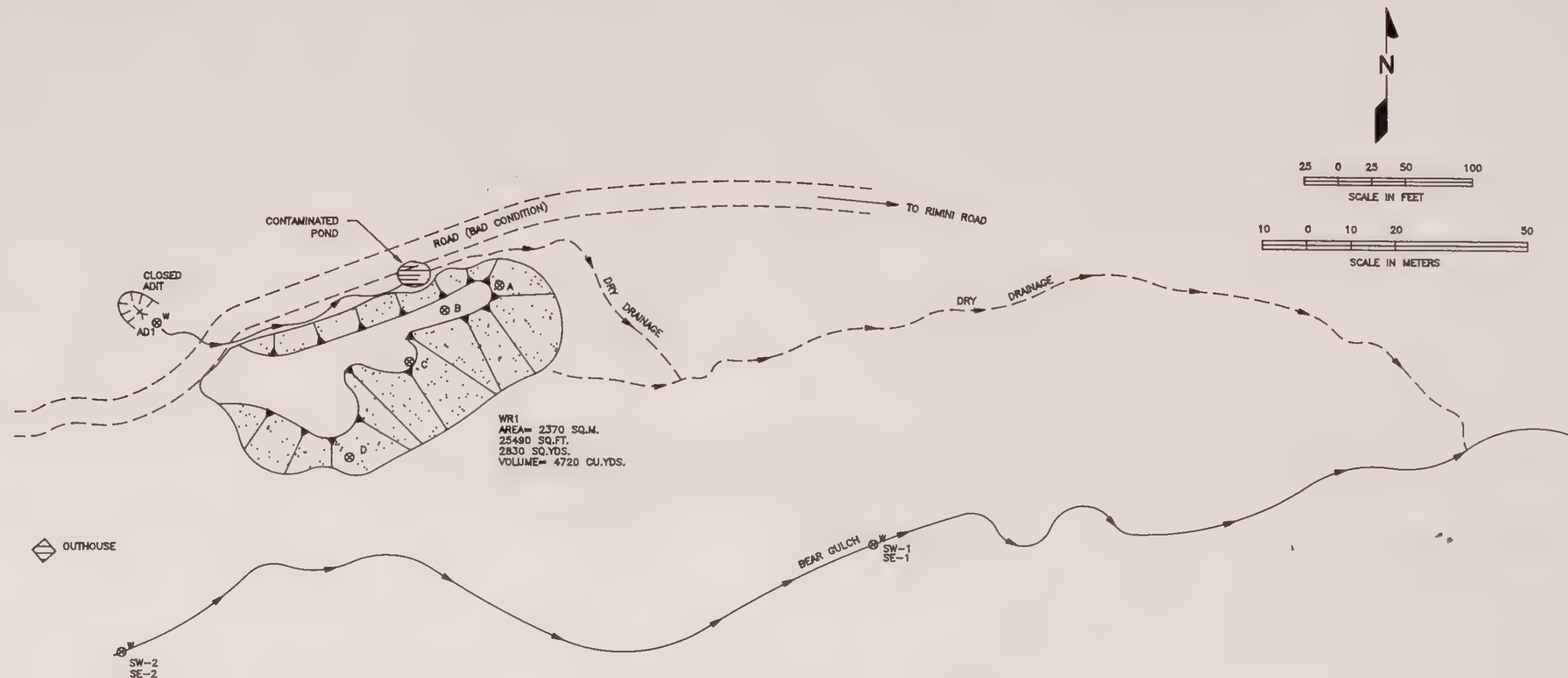
08/11/1994

Well No.	Location	Depth	Yield	Static Water Level
59093	09N 05W 09 C	8.0	100.0	3.00
M:59094	09N 05W 09 CB	25.0	20.0	15.00
M:59095	09N 05W 09 CB	35.0	12.0	15.00
M:122596	09N 05W 09 CB	180.0	8.0	35.00
M:59166	09N 05W 16 CBB	20.0	5.0	6.00
M:59168	09N 05W 20 ACA	93.0	30.0	52.00
M:59167	09N 05W 20 ACA	80.0	48.0	61.00
M:59169	09N 05W 21 A	105.0	20.0	11.00

RP wells
ED ENW



BEAR GULCH, P.A. NO. 25-504
T09N, R05W, SECTION 17
SCALE: 1" = 1000'



LEGEND

⊗	XRF SAMPLE	=====	IMPROVED ROAD
⊗ ^W	WATER SAMPLE GROUND AND SURFACE	-----	UNIMPROVED ROAD
⌋	OPEN ADIT	▨	STRUCTURE
⌋ ⁺	COLLAPSED ADIT	▨	PONDED WATER
→	DRAINAGE	▽	SLOPE DIRECTION
→	DRY DRAINAGE	⬮	WASTE ROCK DUMP OR TAILINGS PILE

DRAWN FOR:

PIONEER
TECHNICAL SERVICES, INC.

TITLE:

BEAR GULCH
PA# 25-504

DRAWING NO.: PTJ40244
DATE: 11/15/94

REV: --
PLOT SCALE: 1 = 25

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): N/A

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): N/A

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): N/A

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): N/A

Comments on potential for mitigation: N/A

SAMPLERS: West

p-Direct reading (Kelway Meter) ; S-Saturated Paste (Orion Meter)

MDSL AMRB/PIONEER 5/16/94

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes X, No , Number: 1 Identification: AD-1

Filled shafts: Yes , No X, Number: Identification:

Seeps/Springs: Yes , No X, Number: Identification:

Groundwater wells within 4 miles?: Yes X, No ;

Number of well logs: 226

Distance to nearest well used for drinking:

 <1,000 ft; 1,000 ft to 0.5 miles; X >0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite , Probable , Possible , Unlikely X.

Low metals in dump; dump is out of floodplain; shallow groundwater.

Approximate Depth to Groundwater: X <25 ft; 25 - 100 ft; >100 ft.

Other observations/notes: Resident downstream approximately 1 mile
stated her well was "polluted" when mine was being pumped in the early
1980s, but cleared up when pumping ceased.

SAMPLERS: Bisch

Flow: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): NM = Not Measured

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes X, No , Name(s): Bear Gulch

Dry streambeds: Yes X, No , **Name(s):** Unnamed drainages away from waste rock dump to Bear Gulch

Other surface water: Yes X, No , Name(s)/Description: Adit
discharge

Waste materials within any floodplain: Yes____, No X Source ID(s):

Approximate Flood frequency? 1 yr, 10 yr, 100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? N/A

High Flow: _____, Average Flow: _____

Distance between waste source(s) and nearest surface water body (ft)?
50 feet from WR-1 to Bear Gulch

Surface water draining onto or through waste sources: Yes____, No X,
Describe: Adit discharge flows next to WR-1 to lined pond.

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Wetlands, agriculture, and irrigation; the site is below Helena's Tenmile drinking water intake.

Observed erosional/sedimentation/stream turbidity problems? Yes____, No X. Distance downstream (ft)? 0-500____; 500-1,000____; >1,000____. Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present):

SAMPLERS: Bisch

[illegible]

Δ (N) per second Δ (N) per second : NOT

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO₃)
Presence of evaporative salt deposits? (ESD)
Discolored or turbid seepage? (SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?
Presence of ferric hydroxide precipitates? (FEOX)
Presence of burned or stressed vegetation? (VEG)
pH \leq 5.0 (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? 1 acre on and around dump

Wetlands present: Yes X, No , Describe: In Bear Gulch (streamside)

Carbonate rocks/soils: Yes , No X, Describe:

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10 ; 10-30 ; 30-100 ;
100-300 X; 300-1,000 ; 1,000-3,000 ; 3,000-10,000 ; 10,000 or
greater ; Comments

Nearest residence: <1,000 ft; 1,000 ft - 0.5 miles; X >0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Bisch, West

[illegible]

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X
Describe:_____

Population within 1 mile: 1-10 X; 10-30____; 30-100____; 100-300____;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____.

Evidence of recreational use on site: Yes X, No____, Describe: Hunting
camp, campfire ring

Accessibility (check each that apply): _____ Easily accessible - no fences,
gates, or warning signs; X Moderately Accessible - barbed wire fences,
road gated, or signs posted; _____ Difficult Access - chain-link fence,
road gated and locked, site guarded (does not include locked or manned
access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment_____
Wilderness Area - Yes____, No X, Comment_____
T&E Species Habitat - Yes X, No____, Comment Peregrine Falcon
Bat Habitat - Yes X, No____, Comment Possible, adit
accessible to bats.

Primary Drainage X; Secondary Drainage____; No Information____:

Riparian Habitat Quality - High____, Medium____, Low X

Wetlands Frontage - High____, Medium____, Low X

Fisheries Habitat and Species Classification - 4

Sport Fishery Classification - 4

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes____, No X, Number____, types and locations:____

Hazardous structures: Yes____, No X, Number____, types and locations:____

Unstable highwalls, pits, trenches, slopes: Yes____, No X, Number____,
types and locations:____

Unstable waste piles, impoundments, undercut banks: Yes____, No X,
Number____, types and locations:____

Fire and/or Explosion hazards: Yes____, No X, Explain:____

Bibliography

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0,
Prepared by Montana Natural Resource Information System, December
1989.

USGS, Topographic Map, MacDonald Pass, Montana, 7 1/2 minute Quadrangle,
1989.

LABORATORY ANALYTICAL DATA

**BEAR GULCH
PA NO. 25-504**

Bear Gulch Mine PA# 25-504
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - TUESDAY
INVESTIGATION DATE: 08/16/94

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	Ag (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
25-504-SE1	1.4 U	10.7 U	297	1.4	3.2	12.7	54.2	25000	0.13	508 J	13.9	14.1 U	16.5 U	47.9	NR
25-504-SE2	1.8 U	14.1 U	195	1.8	4.9	5.4	29.3	10200	0.16	366 J	7.8	34.6	21.6 U	53.8	NR
25-504-WR1	12.0	81.6	82.4	0.9	2.0	6.4	129	36100	0.11	268 J	3.1	229	7.4 U	44.0	NR
BACKGROUND	NR	87 J	84.6	2.5	11.9	7.4 J	21 J	16200	0.053	1130	8 J	144 J	6 UJ	167	NR

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL. POTENT.		SULFUR ACID/BASE POTENT.		SULFATE SULFUR		PYRITIC SULFUR		ORGANIC SULFUR		PYRITIC SULFUR ACID/BASE POTENT.		SULFUR ACID/BASE POTENT.	
	%	1/1000t	%	1/1000t	%	1/1000t	%	1/1000t	%	1/1000t	%	1/1000t	%	1/1000t	%	1/1000t
25-504-WR1	0.45	14.1	10.1	-4	0.43	<0.01	0.02	0.00	10.1							

WATER MATRIX ANALYSES

Metals in Water
Results in ug/L

FIELD ID	Ag	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
25-504-AD1	0.12 U	1.1	5.5 U	8.1 JX	11.3	6.8 U	27.3	151	0.21	48.0	14.4 U	0.6	51.6 U	15.6 U	155
25-504-SW1	0.12 U	1.4	28.7	10.6 JX	12.3	6.8 U	5.9 U	149	0.21	4.0	14.4 U	0.8	51.6 U	15.6 U	43.1
25-504-SW2	0.12 U	1.2	30.3	4.0 UX	8.4 U	6.8 U	5.9 U	189	0.22	13.3	14.4 U	0.7	51.6 U	15.6 U	43.0

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Requested

Wet Chemistry
Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
25-504-AD1	144	<5	78	<0.05	NR
25-504-SW1	35	<5	11	<0.05	NR
25-504-SW2	36	<5	12	<0.05	NR

LEGEND

SE1 - Downstream from dump in Bear Gulch.

SE2 - Upstream from mine in Bear Gulch.

WR1 - Composite of subsamples WR1A, 1B, 1C, and 1D.

BACKGROUND - From the Red Water Mine (25-007-SS1) (1993 Data).

AD1 - Adit discharge above waste rock dump 1, north of road and Bear Gulch.

SW1 - Same as sample 25-504-SE1.

SW2 - Same as sample 25-504-SE2.

XRF ANALYSIS RESULTS

**BEAR GULCH
PA NO. 25-504**

Mine Name: Bear Gulch PA# 25-504
XRF Field Analyses
Results in PPM

XRF SAMPLE I.D.	CrHl	K	Ca	Tl	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Sr
25-504-SE1000		7017.91	11725.2	1151.24		776.334 *	16753.5				80.661 *		407.626
25-504-SE500		6931.53	10094.9	1009.4		827.045 *	13779.1						388.769
25-504-WR1A		23107	18063.1	1861.47		1140.81 *	42297			232.325 *	128.3 *		454.865
25-504-WR1B		34013.2	14202.2	2467.3		691.341 *	87166.3			228.293 *	76.243 *	324.115	564.007
25-504-WR1C		9376.47	22604.8	1021.65		844.847 *	23185.5			122.822 *			399.067
25-504-WR1D		32877.8	4789.53	2193.6		886.23 *	62646			159.338 *			466.226
25-504-WR1-COMP		25905.3	11992	2004.26		967.345 *	56948.6			233.916 *	129.006 *	108.372 *	414.563

XRF SAMPLE I.D.	Zr	Hg	Mo	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th
25-504-SE1000	141.196				81.1285				431.839			
25-504-SE500	147.176				100.307				566.171			
25-504-WR1A	146.037			58.5199 *	177.078				810.2			17.4137 *
25-504-WR1B	178.637		14.5464 *	192.666	239.897			71.0557 *	864.229			41.0324
25-504-WR1C	113.258				40.7734 *				364.387			
25-504-WR1D	274.247		14.3437 *	452.078	192.382				792.799			25.8313 *
25-504-WR1-COMP	176.651		9.60374 *	250.067	171.627				693.924			21.0952 *

* = Estimated Quantity

\$ = Unvalidated Data

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**BEAR GULCH
PA NO. 25-504**

AIMSS SCORESHEET

SITE NAME:

Bear Gulch Mine

PA NUMBER:

25-504

LINE NO.		GROUNDWATER PATHWAY	
1		OBSERVED RELEASE	0
2		EXCEEDENCES	0
3A	GW - LIKELIHOOD	CONTAINMENT	20
3B	OF RELEASE	GW DEPTH	20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
6		WELLS - 1 MI. x 2.5	20.0
7	GW - TARGETS	WELLS - 1 TO 4 MI	218
8		NEAREST WELL	0
9		TARGETS SCORE	LINES 6 + 7 + 8
10		GROUNDWATER SCORE	LINES 4 x 5 x 9
11		SURFACE WATER PATHWAY	
12	SW - LIKELIHOOD	OBSERVED RELEASE	0
13A	OF RELEASE	EXCEEDENCES	100
13B		CONTAINMENT	20
13C		DISTANCE TO SW	10
14		POTENTIAL TO RELEASE	LINES 13A x 13B
15		LIKELIHOOD SCORE	LINES 11 + 12 + 13C
16	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
17		DRINKING WATER POP'N	0
18		IMPACTED DRAINAGE	0
19	SW - TARGETS	WETLANDS	10
20		FISHERY	1
21		RECREATION	5
22		IRRIGATION/STOCK	2
23		T & E SPECIES HABITAT	5
24		TARGETS SCORE	SUM LINES 16 THRU 22
25		SURFACE WATER SCORE	LINES 14 x 15 x 23
26A		AIR PATHWAY	
26B	AIR - LIKELIHOOD	OBSERVED RELEASE	0
26C	OF RELEASE	CONTAINMENT	5
27		DISTANCE TO POPULATION	5
28		POTENTIAL TO RELEASE	LINES 26A x 26B
29		LIKELIHOOD SCORE	LINES 25 + 26C
30	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
31		POPULATION - 4 MILES	100
32		NEAREST RESIDENCE	0
33	AIR - TARGETS	WETLANDS	0
34		PARKS / WILDERNESS	0
35		T & E SPECIES HABITAT	5
36		TARGETS SCORE	SUM LINES 29 THRU 33
37		AIR PATHWAY SCORE	LINES 27 x 28 x 34
38		DIRECT CONTACT PATHWAY	
39A	LIKELIHOOD OF	OBSERVED EXPOSURE	50
39B	EXPOSURE	ACCESSIBILITY	10
39C		DISTANCE TO POPULATION	5
40		POTENTIAL EXPOSURE	LINES 37A x 37B
41		LIKELIHOOD SCORE	LINES 36 + 37C
42	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
43		POPULATION - 1 MILE	1
44	DIRECT CONTACT	NEAREST RESIDENCE	0
45	TARGETS	RECREATIONAL USE	5
46		TARGETS SCORE	SUM LINES 40 THRU 42
47		DIRECT CONTACT SCORE	LINES 38 x 39 x 43
48		TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE	
49		(LINES 10 + 24 + 35 + 44) / 100,000	0.35

LINE NO.				SITE NAME:	Bear Gulch Mine
				PA NUMBER:	25-504
	<u>SITE SAFETY</u>				
1	THREAT	ACCESSIBILITY			10
2	HAZARDS	OPEN SHAFTS	100 EA.		0
3		OPEN ADITS	50 EA.		0
4		UNSTAB. HIWALLS / PITS	75 EA.		0
5		HAZ. STRUCTURES	40 EA.		0
6		EXPLOSIVES			0
7		HAZ. MATERIALS			0
8		HAZARDS SCORE	SUM LINES 2 THRU 7		0
9	TARGETS	POPULATION - 1 MILE			1
10		NEAREST RESIDENCE			0
11		RECREATIONAL USE			5
12		TARGETS SCORE	SUM LINES 9 THRU 11		6
13	SITE SAFETY SCORE		(LINES 1 x 8 x 12) / 1,000		0.00



25-504, #26: Adit discharge and small opening



25-504, #27: Top of WR-1 from west



25-504, #28: South side of WR-1 from west

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: JAY GOULD MINE AND MILLSITE PA#: 25-500

Date: June 21, 1994 Time: 1120-1645

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Belanger, Clark, West; Pioneer

Visitors: None

Weather/Seasonality Observations: Overcast and partly sunny;
slight breeze; 75°-80°F.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #8: Adit discharge
on WR-1, AD-1 sample location; #9: West half of WR-1 from below;
#10: East half of WR-1 from below; #11: TP-1 from above; #12: SW-2
sample location, Gould Creek below WR-1 and above TP-1; #13:
Millsite (Note: Vats); #14: TP-2; #15: TP-3 and dam/beaver ponds.
Video Tape No. 1

General Comments/Observations (not covered specifically in attached Inventory Forms):
Tailings have mostly washed away downstream, only an estimated 30%
of original volume remains. USFS seeded, fertilized, and set up an
irrigation system on the tailings in 1979.

Other Hazardous Materials/Substances Present: Possibly some
"concentrate" material in one of the vats on-site.

General Comments on Potential Remedial Alternatives: Stabilize
lower tailings and/or remove from drainage. Contour and revegetate
waste rock. Route adit discharge around dump.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): JAY GOULD MINE AND MILLSITE PA#: 25-500

Legal Description: T 13N ; R 7W ; Sec. 14 , S 1/2 1/4 1/4

County: LEWIS & CLARK Mining District: STEMPLE

Latitude: N 46° 52' 44" Longitude: W 112° 27' 19"

Primary Drainage Basin and Code: Virginia Creek/10030101

Secondary Drainage Basin: Gould Creek

USGS Quadrangle map name(s): Stemple Pass

Mine Type/Commodities: Hardrock/Gold, Silver

Activity Status: Active ☐ , Inactive/Exploration ☒ , Abandoned ☐ .

Ownership: Known Y ☐ N ☒ ; private/public? Private

Owner, Agent, or Contact (Include address and phone when available): Unknown

Relationship to other mines/sites in the area/district: Unknown

Regulatory Status (Activity by other agencies)? Hardrock permits?

Past Reclamation Activities? N/A

General site features: Elevation 6400' , Slope 15° ,
Aspect South (waste rock); Southeast (tailings)

Land use: Mining ☐ , Recreational ☒ , Residential ☐ , Urban ☐ ,
Agricultural ☒ , Other (Specify)

Area of disturbed/unvegetated lands? Approx. 10 acre(s) .

Site Dimensions: 3,000 feet x 150 feet

Predominant vegetation types: Lodgepole pine/Douglas fir trees,
willows, meadow grasses

Access: roads - good (paved) ☐ , poor (maintained dirt road) ☒ ,
4wd ☐ , trail ☐ .

Other logistical considerations (proximity to other sites). Access
by truck to Stemple Pass on Road #1848 up Fool Hen Gulch Road. The
road up Gould Creek was blocked by a berm.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): JAY GOULD MINE AND MILLSITE PA#: 25-500

Legal Description: T 13N ; R 7W ; Sec. 14 , S 1/2 1/4 1/4

County: LEWIS & CLARK Mining District: STEMPLE

Latitude: N 46° 52' 44" Longitude: W 112° 27' 19"

Primary Drainage Basin and Code: Virginia Creek/10030101

Secondary Drainage Basin: Gould Creek

USGS Quadrangle map name(s): Stemple Pass

Mine Type/Commodities: Hardrock/Gold, Silver

Activity Status: Active , Inactive/Exploration X , Abandoned .

Ownership: Known Y N X ; private/public? Private

Owner, Agent, or Contact (Include address and phone when available): Unknown

Relationship to other mines/sites in the area/district: Unknown

Regulatory Status (Activity by other agencies)? Hardrock permits?
Past Reclamation Activities? N/A

General site features: Elevation 6400' , Slope 15° ,
Aspect South (waste rock); Southeast (tailings)

Land use: Mining , Recreational X , Residential , Urban ,
Agricultural X , Other (Specify)

Area of disturbed/unvegetated lands? Approx. 10 acre(s) .

Site Dimensions: 3,000 feet x 150 feet

Predominant vegetation types: Lodgepole pine/Douglas fir trees,
willows, meadow grasses

Access: roads - good (paved) , poor (maintained dirt road) X ,
4wd , trail .

Other logistical considerations (proximity to other sites). Access
by truck to Stemple Pass on Road #1848 up Fool Hen Gulch Road. The
road up Gould Creek was blocked by a berm.

Well logs within 1 mile radius; (Attach MBMG Well Log Printout(s): There are 2
wells reported within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also
note presence of radioactive minerals). The bedrock geology is primarily
Precambrian sandstone and shale, cut by igneous sills and dikes,
and hydrothermal veins associated with Granite Butte stock. Site
lies in and on both sides (north and south) of Gould Creek, which
flows east away from the site. Gould Creek flows into Virginia
Creek 3.25 miles east of the site.

Mining/milling history, ore type/tenor, host rock, gangue: The
principal mine in the district was the Jay Gould Mine; it was
discovered in 1884. A mill was built shortly after 1884 and
operated until 1890. Runs were also made in 1903 to 1907, and 1910
to 1914. Since 1922, ore was treated at the Hubbard mill, one mile
down creek. Mining operations ceased in 1942. The vein is
composed chiefly of quartz and calcite with relatively small
amounts of iron and manganese oxides, malachite, chalcopryrite,
argentite, and native gold. The vein is a fracture filling
composed mainly of quartz and calcite with minor iron and manganese
oxide minerals, malachite, chalcopryrite, argentite, and native
gold.

Mine Operation?

Shafts - Yes , No X, # , Comment
Adits - Yes X, No , # 1, Comment Discharging
Pits - Yes , No X, # , Comment
Placers - Yes , No X, # , Comment
Other - Yes , No X, # , Comment

Mill Operation? Yes X, No . If yes answer the next three
questions:

Period(s) of Operation: The deposit was worked until 1890. Other
runs were made in 1903 to 1907 and 1910 to 1914.

Origin of Ore Milled - Custom Mill Dedicated Mill X; Number and
names of mines that supplied mill feed:

Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting?
There was a cyanide mill (100-ton) and a 30-stamp amalgamation mill
without concentration.

Montana Bureau of Mines and Geology
Water Well Log Data

08/11/1994

Well No.	Location	Depth	Yield	Static Water Level
67644	13N 07W 11 DA	6.0	10.0	3.00
67645	13N 07W 11 DA	4.0	10.0	3.00



DRAWN FOR: PIONEER TECHNICAL SERVICES, INC.	TITLE: JAY GOULD MINE/MILL PA# 25-500
	DRAWING NO.: PT340207 REV: - DATE: 11/15/94 PLOT SCALE: 1 = 40

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay):
Mostly sand, 70%; 30% silt/clay

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): No significant stratification of remaining tailings, which are up to 10 feet deep.

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): Dry except in streambed

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): Breached completely; most of the tailings have washed away.

Comments on potential for mitigation: Well vegetated; probably do not need amendments.

SOURCE INVENTORY FORM

SAMPLERS: Tuesday, West

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd ³)	LOCATION/DESCRIPTION	CONTAINMENT	PH SU (D/S)*	RADIO-ACTIVITY (MR/HR)	LAB. SAMPLE NO.	DATE/TIME	ANALYSES
TP-1	TAIL	110	Upper (west) area	None	5.6 (D)	0.06	N/A	N/A	XRF Analysis
TP-2A	TAIL	240	Middle tailings near mill	None	6.4 (D)	0.03	25-500-TP-1	06/27/94 1433	T-Metals, ABA, Cyanide
TP-3A-1	TAIL	1,470	Lowest tailings; 0-4', yellow sand/silt	None	6.1 (D)	0.03			
TP-3A-2	TAIL		Lowest tailings; 4-5', gray clay	None	5.8 (D)	0.03			
TP-3A-3	TAIL		Lowest tailings; 5-7.5', yellow sand/clay	None	6.4 (D)	0.03			
WR-1A	WR	7,730	East waste rock, yellow	None	6.7 (D)	0.04	25-500-WR-1	06/27/94 1427	T-Metals, ABA
WR-1B	WR		Middle waste rock, gray	None	6.7 (D)	0.05			

*Direct reading (Kelway Meter) / S-Saturated Paste (Orion Meter)

Comments or deviations from SOPs: 25-500-TP-1 is composite of TP-2A and TP-3A-1 through -3A-3. 25-500-WR-1 is composite of WR-1A and -1B. See SE SW Section 10 (25-212) for background soil sample (1993 inventory data).

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes X, No , Number: 1 Identification: Adit
associated with WR-1

Filled shafts: Yes , No X, Number: Identification:

Seeps/Springs: Yes X, No , Number: 2+ Identification: Hillside,
south of site

Groundwater wells within 4 miles?: Yes X, No ;
Number of well logs: 5

Distance to nearest well used for drinking:
 <1,000 ft; 1,000 ft to 0.5 miles; X >0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite , Probable , Possible X, Unlikely .

Shallow groundwater; uncontained sources containing elevated metal
values.

Approximate Depth to Groundwater: X <25 ft; 25 - 100 ft; >100 ft.

Other observations/notes: N/A

SAMPLERS: Belanger

[illegible]

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): Iron-staining in discharge channel coming out of adit 50' until it disappears into dump.

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes X, No , Name(s): Gould Creek

Dry streambeds: Yes , No X, Name(s):

Other surface water: Yes , No X, Name(s)/Description:

Waste materials within any floodplain: Yes X, No Source ID(s): TP-1, TP-2, and TP-3

Approximate Flood frequency? X 1 yr, 10 yr, 100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? 1.5 cfs

High Flow: 5 cfs, Average Flow: 1.0 cfs

Distance between waste source(s) and nearest surface water body (ft)? 0 feet

Surface water draining onto or through waste sources: Yes X, No , Describe: Gould Creek flows through TP-2 and TP-3; adit discharges onto WR-1.

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?) Fishery, wetland, irrigation, and stock watering

Observed erosional/sedimentation/stream turbidity problems? Yes X, No . Distance downstream (ft)? 0-500 ; 500-1,000 ; >1,000 X. Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): Tailings are present in the stream downstream to the Astor site.

SAMPLERS: Tuesday, Belanger

6 (M) purnaw 20 (2) purnaw : 2072

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO₃)
Presence of evaporative salt deposits? (ESD)
Discolored or turbid seepage? (SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?
Presence of ferric hydroxide precipitates? (FEOX)
Presence of burned or stressed vegetation? (VEG)
pH \leq 5.0 (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? 3 acres

Wetlands present: Yes X, No , Describe: In streambed, beaver ponds

Carbonate rocks/soils: Yes , No X, Describe:

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10 ; 10-30 ; 30-100 X;
100-300 ; 300-1,000 ; 1,000-3,000 ; 3,000-10,000 ; 10,000 or
greater ; Comments

Nearest residence: <1,000 ft; 1,000 ft - 0.5 miles; X >0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Tuesday, Belanger, West

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH/MODERATE/LOW/NONE)
WR-1	FE0X	Dry	41,760	41,760	Yes	Low
TP-1	None	Dry	6,030	6,030	Yes	Low
TP-2	None	Dry	2,640	2,640	Yes	Low
TP-3	None	Dry	9,900	1,980	Yes	Low

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X,
Describe:_____

Population within 1 mile: 1-10 X; 10-30____; 30-100____; 100-300____;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____;
Comments_____

Evidence of recreational use on site: Yes____, No X, Describe:_____

Accessibility (check each that apply): X Easily accessible - no fences,
gates, or warning signs;____ Moderately Accessible - barbed wire fences,
road gated, or signs posted;____ Difficult Access - chain-link fence,
road gated and locked, site guarded (does not include locked or manned
access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment_____
Wilderness Area - Yes____, No X, Comment_____
T&E Species Habitat - Yes____, No X, Comment_____
Bat Habitat - Yes____, No X, Comment_____

Primary Drainage X; Secondary Drainage____; No Information____:

Riparian Habitat Quality - High____, Medium____, Low X

Wetlands Frontage - High____, Medium____, Low X

Fisheries Habitat and Species Classification - 4

Sport Fishery Classification - 4

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes____, No X, Number____, types and locations:_____

Hazardous structures: Yes X, No____, Number 2, types and locations:____
Mill structure is collapsed; cabins.

Unstable highwalls, pits, trenches, slopes: Yes X, No____, Number 1,
types and locations: Steep highwall above adit

Unstable waste piles, impoundments, undercut banks: Yes X, No____,
Number 3, types and locations: Tailings piles are unstable and
undercut by Gould Creek.

Fire and/or Explosion hazards: Yes____, No X, Explain:_____

Bibliography

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0,
Prepared by Montana Natural Resource Information System, December
1989.

MDSL/AMRB Files, Operating Plan of Jay Gould and Stemple Gold Mines,
Author and Date Unknown.

USFS, Environmental Assessment Report, Jay Gould-Stemple-Fool Hen
Project, Lewis and Clark County, July 21, 1980.

USGS, Topographic Map, Stemple Pass, Montana, 7 1/2 minute Quadrangle,
1968.

LABORATORY ANALYTICAL DATA

**JAY GOULD MINE/MILLSITE
PA NO. 25-500**

Jay Gould Mine/Mill PA# 25-500
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - TUESDAY
INVESTIGATION DATE: 06/21/94

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	Ag (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
25-500-SE1	18	10.0	29.3 J	0.6 U	2.1 U	2.5 J	19.1	5680	1.13	218 J	2.0 U	48.8	7.2 U	79.8	NR
25-500-SE2	42.7	16.8	41.6 J	0.6 U	2.1 U	5.4 J	26.5	9260	34.6	162 J	4.6	100	7.2 U	80.4	NR
25-500-SE3	1.2 U	11.6 U	93.9 J	1.1 U	3.8 U	7.2 J	11.5	7380	0.21	235 J	5.8	16.1 U	12.9 U	44.3	NR
25-500-TP1	20.9	23.3	92.7	9.5 J	1.6 U	5.6	149	10200	115 JX	941	1.5 U	678	21.2 J	562 J	21.6
25-500-WR1	3	18.6	132	0.6	3.7	5.9	44.3	8480	0.66 JX	547	7.6	47.2	4.6 UJ	53.6 J	NR
BACKGROUND	NR	21.3	145 JX	1.4 J	5.28	8.61	29.6	11900	0.758 JX	889	12.3 J	60.3 J	8.01 UJ	121	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL POTENT		SULFUR ACID BASE POTENT		SULFATE		PYRITIC		ORGANIC		PYRITIC		SULFUR		SULFUR	
	%	1/1000t	%	1/1000t	%	1/1000t	%	1/1000t	%	1/1000t	%	1/1000t	%	1/1000t	%	1/1000t	%	1/1000t
25-500-TP1	<0.01	0.00	169	169	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
25-500-WR1	0.01	0.31	75.8	75.5	<0.01	<0.01	<0.01	<0.01	0.01	0.01	<0.01	<0.01	0.31	0.00	169	75.5	0.31	75.5

WATER MATRIX ANALYSES

Metals in Water
Results in ug/L

FIELD ID	Ag	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
25-500-AD1	0.12 U	1.1 U	118	2.6 U	8.7 U	4.7 UX	4.6 U	9.4 U	0.11 U	4.4 U	8.0 U	1.6	29.4 U	13.2	114
25-500-SW1	0.12 U	1.5	78.1	2.6 U	8.7 U	5.7 JX	4.6 U	36.3	0.11 U	7.13	8.0 U	1.8	29.4 U	9.4	119
25-500-SW2	0.12 U	1.3	49.7	2.6 U	8.7 U	4.7 JX	4.6 U	20.5	0.11 U	7.1	8.0 U	1.5	29.4 U	4.67	109
25-500-SW3	0.12 U	1.3	38.4	2.6 U	8.7 U	4.7 UX	4.6 U	64.7	0.11 U	5.2	8.0 U	1.6	29.4 U	4.67	106

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Wet Chemistry
Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS		CHLORIDE		SULFATE		NO3/NO2-N		CYANIDE	
	140	178	<5	<5	5.0	<5	0.13	<0.05	NR	NR
25-500-AD1	140	178	<5	<5	5.0	<5	0.13	<0.05	NR	NR
25-500-SW1	178	126	<5	<5	<5	<5	<0.05	<0.05	NR	NR
25-500-SW2	126	110	<5	<5	<5	<5	<0.05	<0.05	NR	NR
25-500-SW3	110		<5	<5	<5	<5	<0.05	<0.05	NR	NR

LEGEND

SE1 - Downstream of tailings in Gould Creek.
SE2 - Downgradient of mine and upstream of mill and tailings in Gould Creek.
SE3 - Upstream of mine in Gould Creek.
TP1 - Composite of sub-samples TP2A and TP3A-1 through 3A-3.
WR1 - Composite of sub-samples WR1A and 1B.
BACKGROUND - From the SE SW Sec. 10 Mine (25-212-SS1) (1993 Data).

AD1 - Acid discharge on WR1.
SW1 - Same as sample 25-500-SE1.
SW2 - Same as sample 25-500-SE2.
SW3 - Same as sample 25-500-SE3.

XRF ANALYSIS RESULTS

**JAY GOULD MINE/MILLSITE
PA NO. 25-500**

Mine Name: Jay Gould Mine/Millsite PA# 25-500
XRF Field Analyses
Results in PPM

XRF SAMPLE I.D.	CrHI	K	Ca	Ti	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Sr
25-500-TP1		11494.7	8257.97	1611.46		1139.3 *	21672.1				126.711 *	123.089 *	51.7937
25-500-TP1-COMP		13163.4	69563	438.195 *		1350.41 *	11091.5			84.7864 *	552.146		100.414
25-500-TP2A		6225.79	41775.8	322.963 *		448.465 *	3962.22				147.087 *	53.6136 *	83.1354
25-500-TP3A1		13399.9	72689.5	377.344 *		1388.28 *	12788.1			138.231 *	702.008		107.293
25-500-TP3A2		14944.4	84304.2	293.459 *		1944.77 *	15990.9			158.729 *	893.096		97.1598
25-500-TP3A3		3865.16	23433.8			405.61 *	1909.89				166.852 *		31.9418
25-500-WR1A		16736.2	21833.2	1024.83		1549.07 *	28420.9				206.547 *	146.103 *	26.7386 *
25-500-WR1B		19832.6	26334.8	1393.22		1088.39	18615.7				161.477 *	78.1329 *	45.3019
25-500-WR1-COMP		18495.6	23029.3	949.608		1479.21 *	28275.6				214.709 *	148.815 *	36.4086 *

XRF SAMPLE I.D.	Zr	Hg	Mo	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th
25-500-TP1	231.096				92.6184				594.485			12.7803 *
25-500-TP1-COMP	43.049			554.87	53.9943 *			76.9304 *	343.198			
25-500-TP2A	56.9579			50.1865 *	31.8338 *				149.787			
25-500-TP3A1	42.1466	65.7554 *		839.83	64.3378 *				371.017			
25-500-TP3A2	49.1051	111.218 *		976.497	85.848			88.1021 *	459.261			
25-500-TP3A3	16.463 *			116.964	22.3627 *				101.003			
25-500-WR1A	140.159				106.11				562.921			
25-500-WR1B	145.673				117.992				667.015			15.8146 *
25-500-WR1-COMP	137.147				114.882				661.82			

* = Estimated Quantity

\$ = Unvalidated Data

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**JAY GOULD MINE/MILLSITE
PA NO. 25-500**

AIMSS SCORESHEET

SITE NAME:
PA NUMBER:

Jay Gould Mine/Mill
25-500

LINE NO.		GROUNDWATER PATHWAY	
1		OBSERVED RELEASE	0
2		EXCEEDENCES	0
3A	GW - LIKELIHOOD OF RELEASE	CONTAINMENT	20
3B		GW DEPTH	20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B 400
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C 400
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 1.229
6	GW - TARGETS	WELLS - 1 MI. x 2.5	5.0
7		WELLS - 1 TO 4 MI	3
8		NEAREST WELL	0
9		TARGETS SCORE	LINES 6 + 7 + 8 8.0
10		GROUNDWATER SCORE	LINES 4 x 5 x 9 3933
SURFACE WATER PATHWAY			
11		OBSERVED RELEASE	300
12		EXCEEDENCES	0
13A	SW - LIKELIHOOD OF RELEASE	CONTAINMENT	20
13B		DISTANCE TO SW	20
13C		POTENTIAL TO RELEASE	LINES 13A x 13B 400
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C 700
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 1.453
16	SW - TARGETS	DRINKING WATER POP'N	0
17		IMPACTED DRAINAGE	1
18		WETLANDS	10
19		FISHERY	1
20		RECREATION	5
21		IRRIGATION/STOCK	2
22		T & E SPECIES HABITAT	0
23		TARGETS SCORE	SUM LINES 16 THRU 22 19
24		SURFACE WATER SCORE	LINES 14 x 15 x 23 19325
AIR PATHWAY			
25		OBSERVED RELEASE	0
26A	AIR - LIKELIHOOD OF RELEASE	CONTAINMENT	5
26B		DISTANCE TO POPULATION	5
26C		POTENTIAL TO RELEASE	LINES 26A x 26B 25
27		LIKELIHOOD SCORE	LINES 25 + 26C 25
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 0.096
29	AIR - TARGETS	POPULATION - 4 MILES	30
30		NEAREST RESIDENCE	0
31		WETLANDS	0
32		PARKS / WILDERNESS	0
33		T & E SPECIES HABITAT	0
34		TARGETS SCORE	SUM LINES 29 THRU 33 30
35		AIR PATHWAY SCORE	LINES 27 x 28 x 34 72
DIRECT CONTACT PATHWAY			
36		OBSERVED EXPOSURE	0
37A	LIKELIHOOD OF EXPOSURE	ACCESSIBILITY	20
37B		DISTANCE TO POPULATION	5
37C		POTENTIAL EXPOSURE	LINES 37A x 37B 100
38		LIKELIHOOD SCORE	LINES 36 + 37C 100
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 0.076
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE	1
41		NEAREST RESIDENCE	0
42		RECREATIONAL USE	0
43		TARGETS SCORE	SUM LINES 40 THRU 42 1
44		DIRECT CONTACT SCORE	LINES 38 x 39 x 43 8
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE (LINES 10 + 24 + 35 + 44) / 100,000		0.23

SITE NAME:
PA NUMBER:

Jay Gould Mine/Mill
25-500

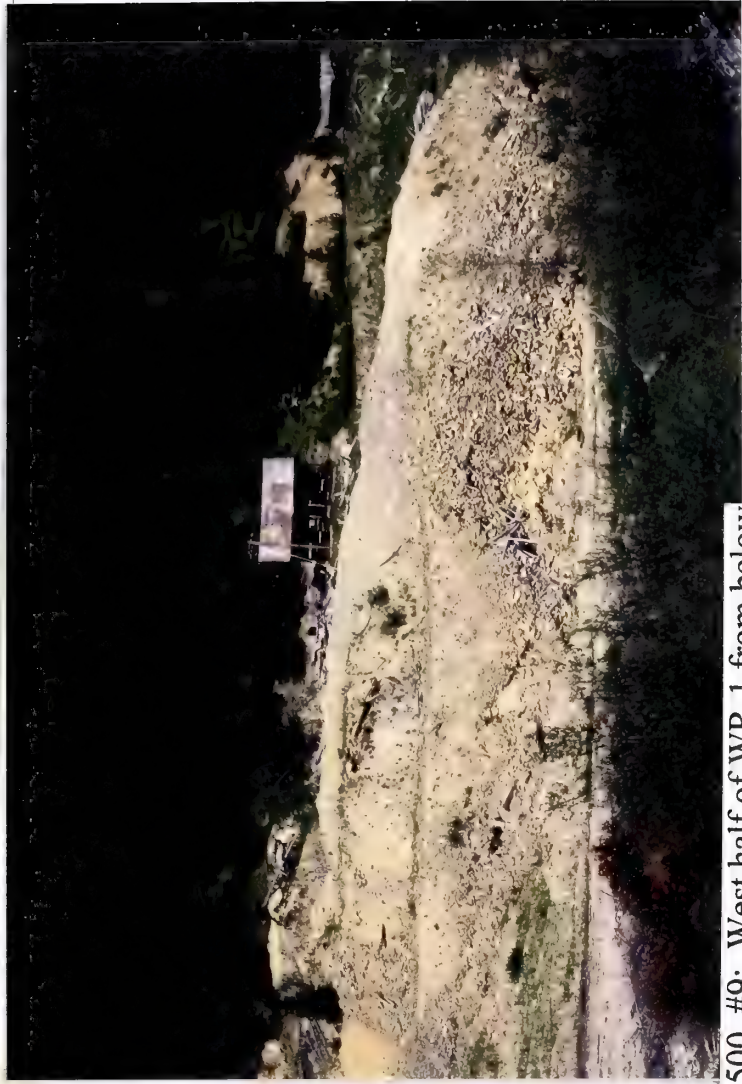
LINE
NO.

SITE SAFETY

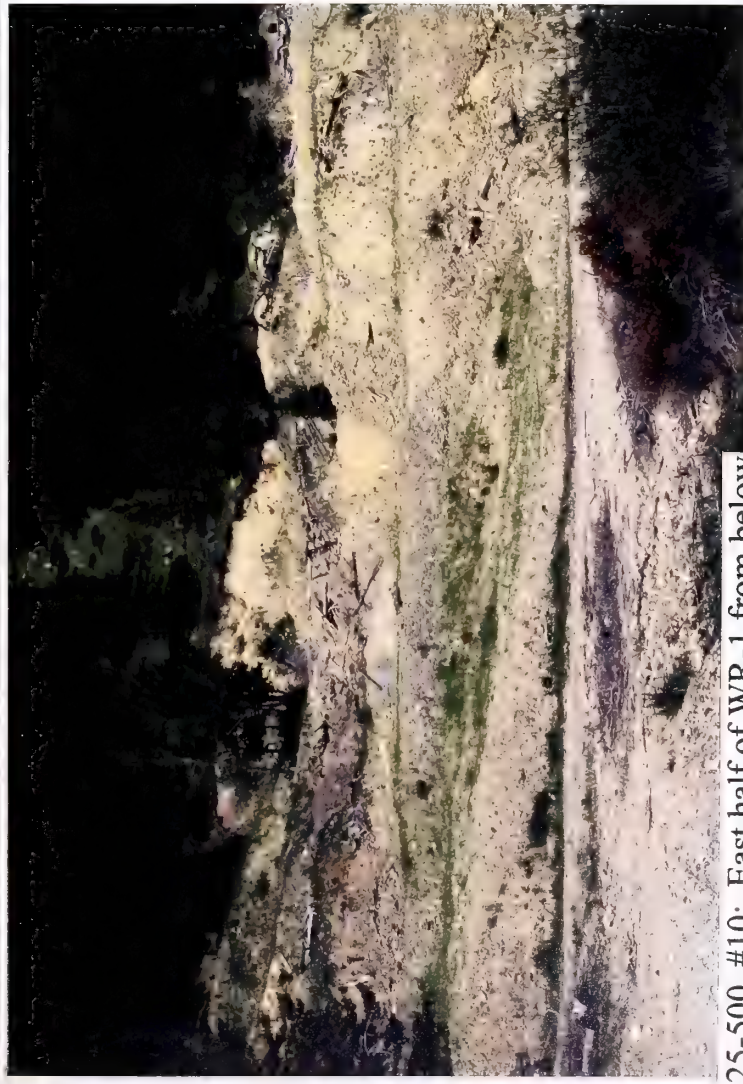
1	THREAT	ACCESSIBILITY	20
2		OPEN SHAFTS 100 EA.	0
3		OPEN ADITS 50 EA.	0
4	HAZARDS	UNSTAB. HIWALLS / PITS 75 EA.	75
5		HAZ. STRUCTURES 40 EA.	80
6		EXPLOSIVES	0
7		HAZ. MATERIALS	0
8		HAZARDS SCORE SUM LINES 2 THRU 7	155
9		POPULATION - 1 MILE	1
10	TARGETS	NEAREST RESIDENCE	0
11		RECREATIONAL USE	0
12		TARGETS SCORE SUM LINES 9 THRU 11	1
13		SITE SAFETY SCORE (LINES 1 x 8 x 12) / 1,000	3.10



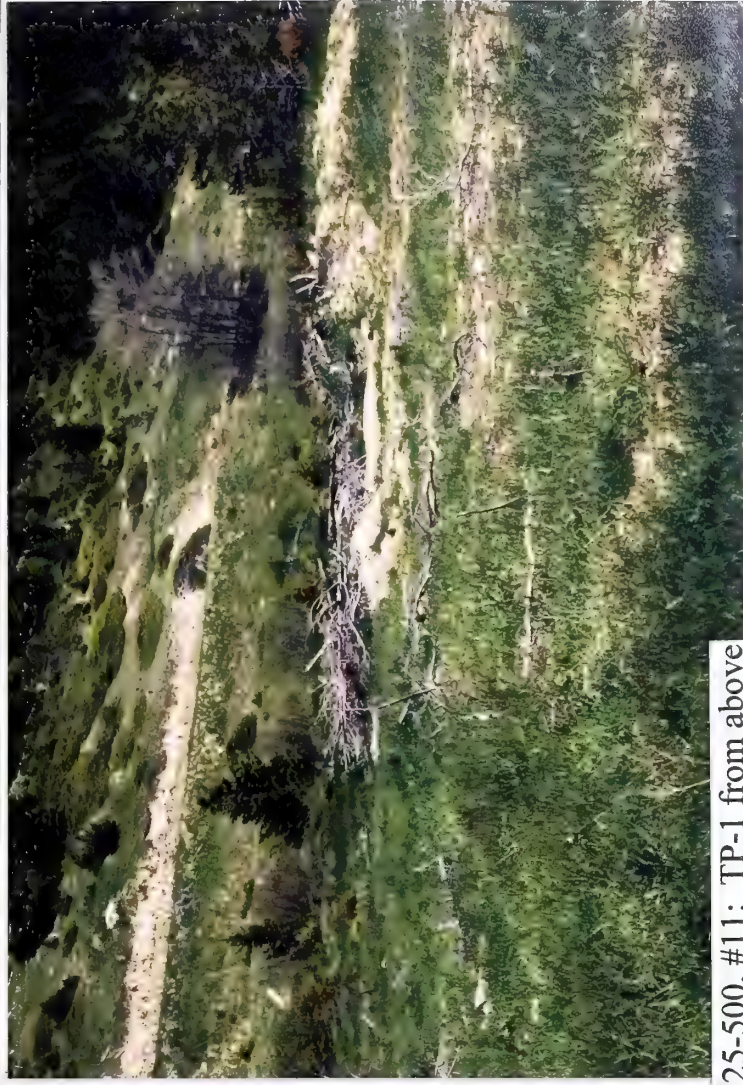
25-500, #8: Adit discharge on WR-1; AD-1 sample location



25-500, #9: West half of WR-1 from below



25-500, #10: East half of WR-1 from below



25-500, #11: TP-1 from above



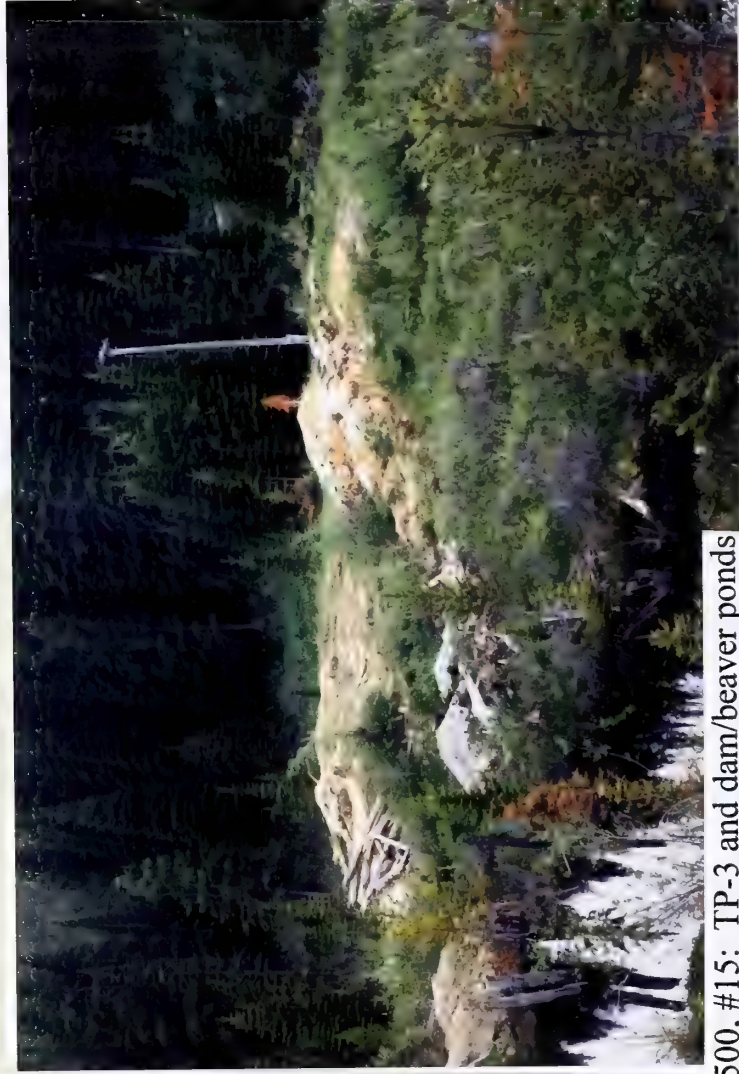
25-500, #12: SW-2 sample location



25-500, #13: Millsite (Note: Vats)



25-500, #14: TP-2



25-500, #15: TP-3 and dam/beaver ponds

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: NEW JAY GOULD MILLSITE PA#: 25-502

Date: July 29, 1994 Time: 1000-1200

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Clark, West; Pioneer

Visitors: Driver delivering fuel to mine up road.

Weather/Seasonality Observations: Cloudy; warm (70°-80°F); breezy
(8 mph wind); dry, hot summer.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #1: Mill building;
#2: TP-1 from road above; #3: Overflow pond below TP-1 and marsh;
#4: Tunnel culvert and SW-3 sample location, upstream; #5: Overflow
outfall from TP-1 and SW-2 sample location; #6: SW-1 sample
location, downstream Fool Hen Gulch below tailings; #7: TP-1 from
lower berm. Video Tape No. 3

General Comments/Observations (not covered specifically in attached Inventory Forms): The mill building and surrounding equipment were in good condition.
There was a phone inside the mill building in working order.

Other Hazardous Materials/Substances Present: Diesel fuel spilled
on the ground in front of the mill building (approx. 6 square
feet).

General Comments on Potential Remedial Alternatives: Neutralize,
dewater, and revegetate tailings pond, if processing done.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): NEW JAY GOULD MILLSITE PA#: 25-502

Legal Description: T 13N ; R 7W ; Sec. 13 , NW 1/4 NW 1/4 SW 1/4

County: LEWIS & CLARK Mining District: STEMPLE

Latitude: N 46° 53' 24.0" Longitude: W 112° 26' 31.4"

Primary Drainage Basin and Code: Virginia Creek/10030101

Secondary Drainage Basin: Fool Hen Creek

USGS Quadrangle map name(s): Stemple Pass

Mine Type/Commodities: Millsite/Unknown

Activity Status: Active , Inactive/Exploration X , Abandoned .

Ownership: Known Y N X ; private/public? Private

Owner, Agent, or Contact (Include address and phone when available): Unknown

Relationship to other mines/sites in the area/district: _____

Immediately upgradient of the NE NW Sec. 13 site.

Regulatory Status (Activity by other agencies)? Hardrock permits?

Past Reclamation Activities? Possible hardrock permit (recently active in 1991)

General site features: Elevation 5680' , Slope 15°-20° , Aspect Northeast

Land use: Mining X , Recreational X , Residential _____ , Urban _____ , Agricultural _____ , Other (Specify) _____

Area of disturbed/unvegetated lands? 2 _____ acre(s) .

Site Dimensions: 200 feet x 400 feet

Predominant vegetation types: Good amount of wetland vegetation; raspberry bushes; willows; alder in drainage; Lodgepole pine and Engelmann spruce on hillside.

Access: roads - good (paved) _____ , poor (maintained dirt road) X , 4wd _____ , trail _____ .

Other logistical considerations (proximity to other sites). On road to Jay Gould Mine/Millsite (old), Pangewasset, and Astor

Well logs within 1 mile radius; (Attach MEMG Well Log Printout(s): There are 3
wells reported within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also
note presence of radioactive minerals). Fool Hen Creek flows east to west through
the site and the creek originates at the culvert (drain tunnel).
Fool Hen Creek flows into Virginia Creek 1,000 feet northeast of
the site.

Mining/milling history, ore type/tenor, host rock, gangue: No
information available.

Mine Operation?

Shafts - Yes___, No X, # ___ , Comment_____
Adits - Yes___, No X, # ___ , Comment_____
Pits - Yes___, No X, # ___ , Comment_____
Placers - Yes___, No X, # ___ , Comment_____
Other - Yes X, No___, # 1 , Comment Mill

Mill Operation? Yes X, No____. If yes answer the next three
questions:

Period(s) of Operation: Unknown; recent - 1991

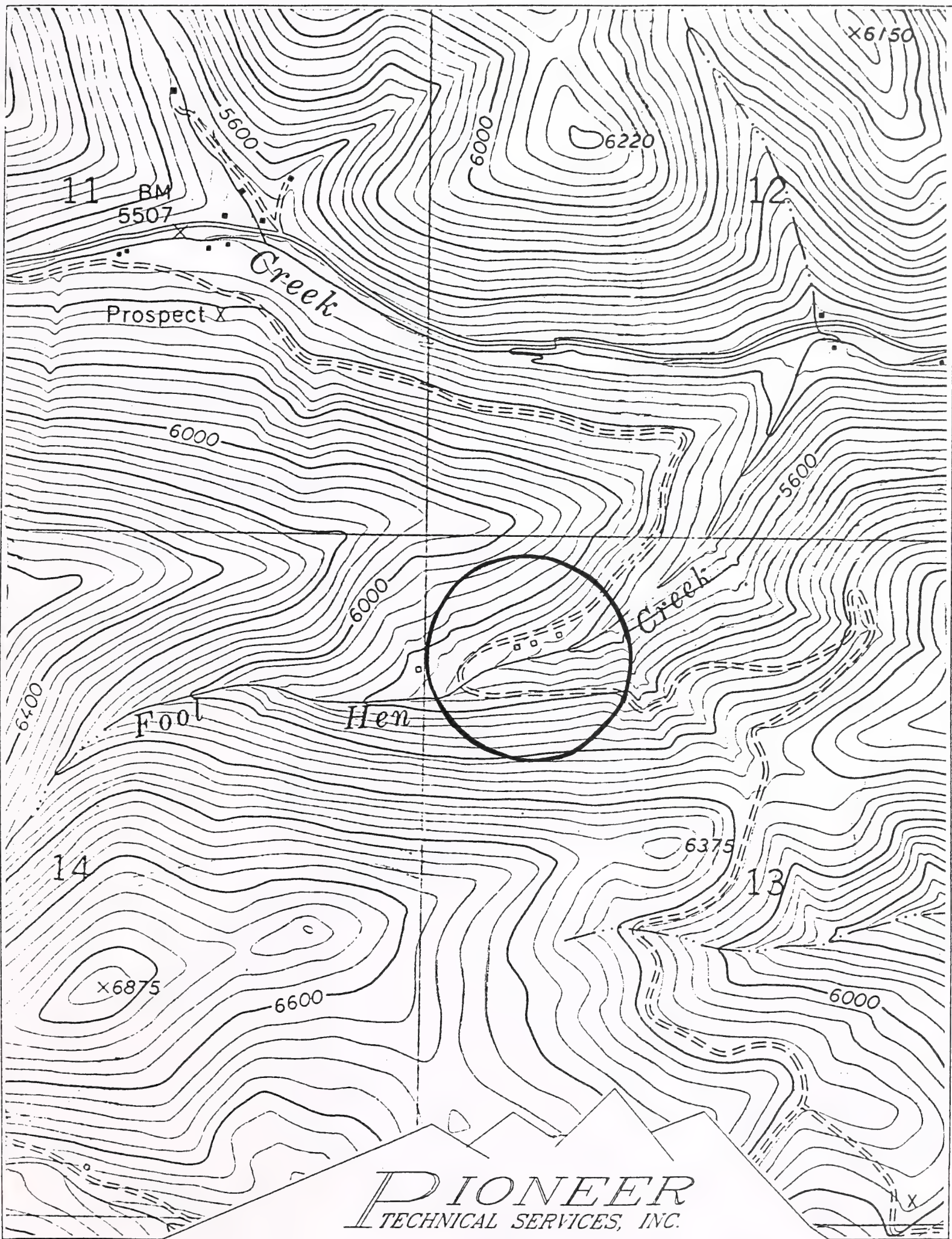
Origin of Ore Milled - Custom Mill X Dedicated Mill___; Number and
names of mines that supplied mill feed: Jay Gould Mine and
possibly other mines in the area

Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting?
CN-

Montana Bureau of Mines and Geology
Water Well Log Data

08/12/1994

Well No.	Location	Depth	Yield	Static Water Level
:67644	13N 07W 11 DA	6.0	10.0	3.00
:67645	13N 07W 11 DA	4.0	10.0	3.00
:67646	13N 07W 12	105.0	20.0	0.00



PIONEER
TECHNICAL SERVICES, INC.

NEW JAY GOULD MILLSITE, P.A. NO. 25-502

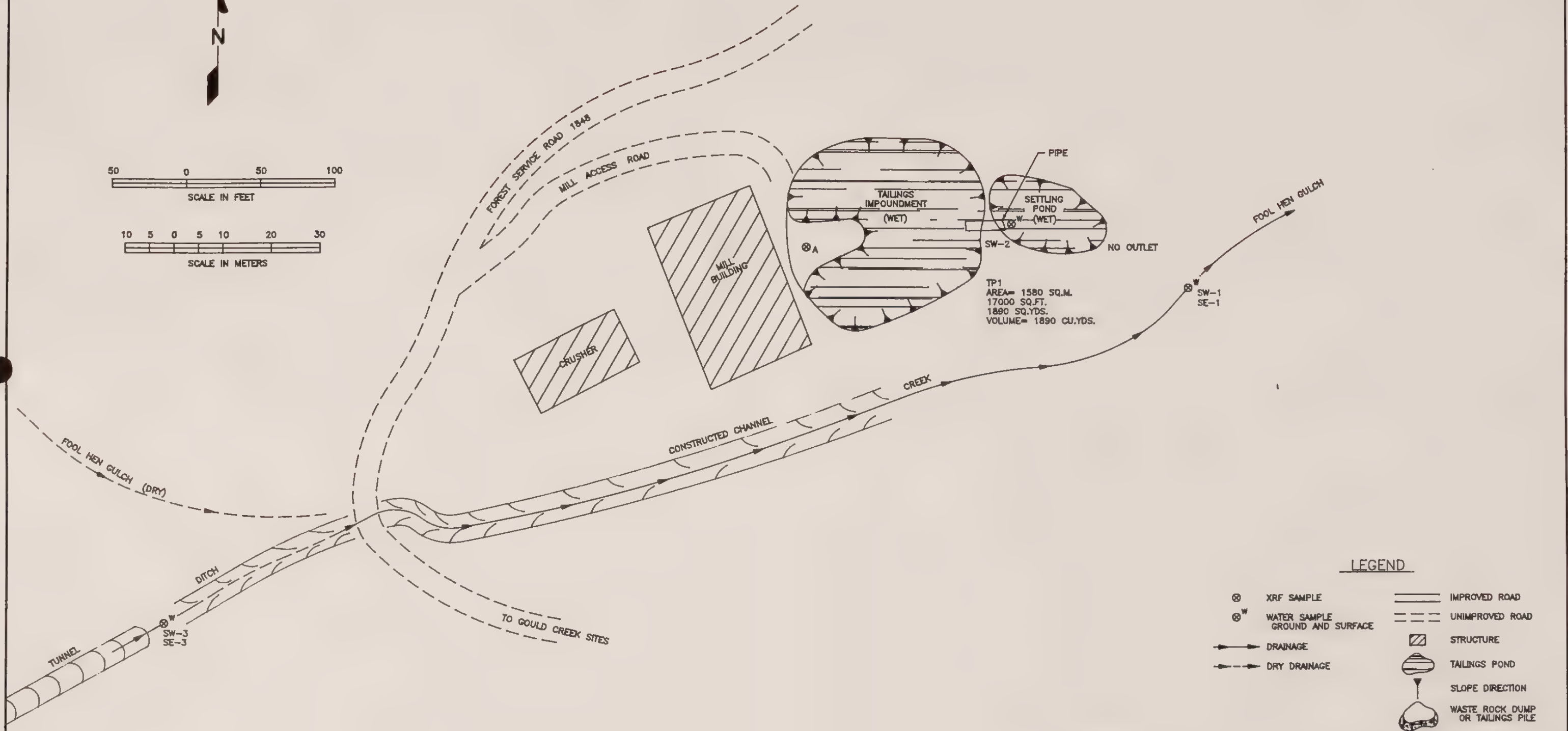
T13N, R07W, SECTION 13

SCALE: 1" = 1000'



50 0 50 100
SCALE IN FEET

10 5 0 5 10 20 30
SCALE IN METERS



LEGEND

- | | | | |
|----------------|---------------------------------|-------|----------------------------------|
| ⊗ | XRF SAMPLE | ===== | IMPROVED ROAD |
| ⊗ ^W | WATER SAMPLE GROUND AND SURFACE | ----- | UNIMPROVED ROAD |
| → | DRAINAGE | ▨ | STRUCTURE |
| - - -> | DRY DRAINAGE | ⊖ | TAILINGS POND |
| | | ↓ | SLOPE DIRECTION |
| | | ⬇ | WASTE ROCK DUMP OR TAILINGS PILE |

DRAWN FOR:

PIONEER
TECHNICAL SERVICES, INC.

TITLE:

NEW JAY GOULD
PA# 25-502

DRAWING NO.: PT340228
DATE: 11/19/94

REV: -
PLOT SCALE: 1 = 20

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): Mostly sand and silt

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): 3.5 feet at discharge pipe; brown tailings, 0 to 2.5 feet; gray, 2.5 to 3.5 feet; gravel below (no liner).

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): Wet

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): Good condition; 1 foot of freeboard with overflow pipe to second pond below.

Comments on potential for mitigation: Some vegetation already; dewater, amend or caver, and revegetate.

SAMPLERS: West

D-Direct reading (Kelway Meter) ; S-Saturated Paste (Orion Meter)

Comments or deviations from SOPs: 25-502-TP-1 is composite of TP-1A-1 and -1A-2. See SE SW Section 10 mine (25-212) for background soil sample (1993 inventory data).

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes X, No , Number: 1 Identification: Above millsite (SW-3); flows into Fool Hen Gulch (a tunnel, not really an adit).

Filled shafts: Yes , No X, Number: Identification:

Seeps/Springs: Yes X, No , Number: 1 Identification: Below mill in drainage

Groundwater wells within 4 miles?: Yes X, No ;
Number of well logs: 9

Distance to nearest well used for drinking:
 <1,000 ft; 1,000 ft to 0.5 miles; X >0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite , Probable , Possible X, Unlikely .

No liner in ponds; high arsenic in tailings; shallow groundwater in alluvial drainage.

Approximate Depth to Groundwater: X <25 ft; 25 - 100 ft; >100 ft.

Other observations/notes: N/A

SAMPLERS:

[illegible]

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): :

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes X, No , Name(s): Fool Hen Gulch below mill;
water from tunnel discharge

Dry streambeds: Yes X, No , Name(s): Fool Hen Gulch above mill

Other surface water: Yes X, No , Name(s) /Description: Tunnel
discharge

Waste materials within any floodplain: Yes____, No X Source ID(s):

Approximate Flood frequency? 1 yr, 10 yr, 100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? N/A

High Flow: _____, Average Flow: _____

Distance between waste source(s) and nearest surface water body (ft)?
30 feet

Surface water draining onto or through waste sources: Yes____, No X,
Describe:

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Wetlands, possible fishery, agriculture, and irrigation.

Observed erosional/sedimentation/stream turbidity problems? Yes____, No__X__. Distance downstream (ft)? 0-500____; 500-1,000____; >1,000____. Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present):_____

SAMPLERS: Clark, West

Low: Estimated (E) or Measured (M)?

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO₃)

Presence of evaporative salt deposits? (ESD)

Discolored or turbid seepage? (SPG)

Presence of long filamentous algae in drainages, mosses in moist areas?

Presence of ferric hydroxide precipitates? (FEOX)

Presence of burned or stressed vegetation? (VEG)

pH \leq 5.0 (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? 2 acres at ponds and in drainage

Wetlands present: Yes X, No , Describe: Wetlands with thick vegetation in drainage below site

Carbonate rocks/soils: Yes____, No X, Describe:_____

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10___; 10-30___; 30-100 X;
100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or
greater___; Comments_____

Nearest residence: <1,000 ft; 1,000 ft - 0.5 miles; X >0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:

observed	high	moderate	low	none
----------	------	----------	-----	------

SAMPLERS: Clark, West

Notes and Clarifications: SW-3 is tunnel discharge.

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X.
Describe: Workers may be on-site if mill operates.

Population within 1 mile: 1-10____; 10-30 X; 30-100____; 100-300____;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____;
Comments_____

Evidence of recreational use on site: Yes____, No X, Describe:_____

Accessibility (check each that apply): X Easily accessible - no fences, gates, or warning signs;____ Moderately Accessible - barbed wire fences, road gated, or signs posted;____ Difficult Access - chain-link fence, road gated and locked, site guarded (does not include locked or manned access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment_____
Wilderness Area - Yes____, No X, Comment_____
T&E Species Habitat - Yes X, No____, Comment Peregrine Falcon
Bat Habitat - Yes____, No X, Comment_____

Primary Drainage X; Secondary Drainage____; No Information____:

Riparian Habitat Quality - High____, Medium____, Low X

Wetlands Frontage - High____, Medium____, Low X

Fisheries Habitat and Species Classification - 4

Sport Fishery Classification - 4

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes____, No X, Number____, types and locations:____
Culvert open and accessible, but safe.

Hazardous structures: Yes X, No____, Number 3, types and locations:____
Old cabins; new mill building is safe.

Unstable highwalls, pits, trenches, slopes: Yes____, No X, Number____, types and locations:_____

Unstable waste piles, impoundments, undercut banks: Yes____, No X, Number____, types and locations:_____

Fire and/or Explosion hazards: Yes____, No X, Explain:_____

Bibliography

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0,
Prepared by Montana Natural Resource Information System, December
1989.

USGS, Topographic Map, Stemple Pass, Montana, 7 1/2 minute Quadrangle,
1968.

LABORATORY ANALYTICAL DATA

**NEW JAY GOULD MILLSITE
PA NO. 25-502**

New Jay Gould Mill PA# 25-502
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - TUESDAY
INVESTIGATION DATE: 07/29/94

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	Ag (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
25-502-SE1	14.1 JX	10.1 UJ	310	1.2 U	3.9	7.2	31.7	9670	0.57	205	7.9	74.6	15.5 UJ	117	NR
25-502-SE3	0.9 JX	5.7 UJ	86.9	0.7 U	2.5	2.9	15.6	11100	0.06	261	8.0	39.8	8.7 UJ	57.6	NR
25-502-TP1	6.1 JX	197 J	78.4	4.1	4.5	6.7	44.3	15300	0.67	527	8.2	376	10.5 UJ	325	0.331
BACKGROUND	NR	21.3	145 JX	1.4 J	5.28	8.61	29.6	11900	0.758 JX	889	12.3 J	60.3 J	8.01 UJ	121	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		SULFUR ACID BASE		SULFATE		PYRITIC		PYRITIC		SULFUR	
	%	U/1000t	POTENT.	U/1000t	%	U/1000t	%	U/1000t	ACID BASE	POTENT.	%	U/1000t
25-502-TP1	0.99	30.9	76.3	45.4	0.03	0.20	0.76	6.25	70.1			

WATER MATRIX ANALYSES

Metals in Water
Results in ug/L

FIELD ID	Ag	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CAL.C. (mg CaCO3/L)
25-502-SW1	0.12 U	1.7	417	4.0 UX	8.4 U	6.8 U	5.9 U	45.9	0.08 U	3.9	14.4 U	1.2	51.6 U	15.6 U	116
25-502-SW2	0.12 U	2.0	345	5.9 JX	8.4 U	7.6	5.9 U	12.3 U	0.08 U	3.9	14.4 U	1.5	51.6 U	15.6 U	82.6
25-502-SW3	0.12 U	1.3 U	443	4.0 UX	8.4 U	6.8 U	5.9 U	12.3 U	0.08 U	2.3 U	14.4 U	1.7	51.6 U	15.6 U	123

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Wet Chemistry
Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
25-502-SW1	113	<5	10	0.11	0.01
25-502-SW2	112	<5	5.0	0.06	<0.005
25-502-SW3	4.0	<5	8.0	0.12	<0.005

LEGEND

SEL - 100' downstream of site.
SE3 - At tunnel discharge.
TP1 - Composite of subsamples TP1A-1 and 1A-2.
BACKGROUND - From the SE SW Sec. 10 Mine (25-212-SS1) (1993 Data).

SW1 - Same as sample 25-502-SEL.
SW2 - 8" PVC pipe where TP1 flows into Pond #2.
SW3 - Same as sample 25-502-SEL.

XRF ANALYSIS RESULTS

**NEW JAY GOULD MILLSITE
PA NO. 25-502**

Mine Name: New Jay Gould Millsite PA# 25-502
XRF Field Analyses
Results in PPM

XRF SAMPLE I.D.	CrHl	K	Ca	Ti	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Sr
25-502-TP1A1		7908.65	32021.7	437.439 *		389.024 *	6151.66						58.5379
25-502-TP1A1-DUP		8033.26	31621.9	330.097 *		576.546 *	6289.85				73.393 *		62.8002
25-502-TP1A2		21674.3	38831.8	1513.78		1542.58 *	27094.5	447.095 *		79.3396 *	571.151	665.173	138
25-502-TP1A-COMP		13152.2	37847.3	849.27		987.043 *	16976.8				258.996 *	214.309 *	94.498
XRF SAMPLE I.D.	Zr	Hg	Mo	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th	
25-502-TP1A1	58.3508			62.7525	51.169 *				247.555				
25-502-TP1A1-DUP	64.0984		7.71098 *	56.4188 *	49.7979 *				237.521				
25-502-TP1A2	177.995		11.1421 *	939.546	114.3				549.289			17.0474 *	
25-502-TP1A-COMP	107.721		8.55315 *	304.066	71.3934				381.403			13.0682 *	

* = Estimated Quantity

\$ = Unvalidated Data

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**NEW JAY GOULD MILLSITE
PA NO. 25-502**

AIMSS SCORESHEET

SITE NAME:
PA NUMBER:

New Jay Gould Mill
25-502

LINE NO.		GROUNDWATER PATHWAY	
1		OBSERVED RELEASE	0
2		EXCEEDENCES	0
3A	GW - LIKELIHOOD	CONTAINMENT	10
3B	OF RELEASE	GW DEPTH	20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
6		WELLS - 1 MI. x 2.5	7.5
7	GW - TARGETS	WELLS - 1 TO 4 MI	6
8		NEAREST WELL	0
9		TARGETS SCORE	LINES 6 + 7 + 8
10		GROUNDWATER SCORE	LINES 4 x 5 x 9
		<u>SURFACE WATER PATHWAY</u>	
11		OBSERVED RELEASE	0
12	SW - LIKELIHOOD	EXCEEDENCES	0
13A	OF RELEASE	CONTAINMENT	10
13B		DISTANCE TO SW	10
13C		POTENTIAL TO RELEASE	LINES 13A x 13B
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
16		DRINKING WATER POP'N	0
17		IMPACTED DRAINAGE	0
18	SW - TARGETS	WETLANDS	10
19		FISHERY	1
20		RECREATION	5
21		IRRIGATION/STOCK	2
22		T & E SPECIES HABITAT	5
23		TARGETS SCORE	SUM LINES 16 THRU 22
24		SURFACE WATER SCORE	LINES 14 x 15 x 23
		<u>AIR PATHWAY</u>	
25		OBSERVED RELEASE	0
26A	AIR - LIKELIHOOD	CONTAINMENT	1
26B	OF RELEASE	DISTANCE TO POPULATION	5
26C		POTENTIAL TO RELEASE	LINES 26A x 26B
27		LIKELIHOOD SCORE	LINES 25 + 26C
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
29		POPULATION - 4 MILES	30
30	AIR - TARGETS	NEAREST RESIDENCE	0
31		WETLANDS	0
32		PARKS / WILDERNESS	0
33		T & E SPECIES HABITAT	5
34		TARGETS SCORE	SUM LINES 29 THRU 33
35		AIR PATHWAY SCORE	LINES 27 x 28 x 34
		<u>DIRECT CONTACT PATHWAY</u>	
36		OBSERVED EXPOSURE	0
37A	LIKELIHOOD OF	ACCESSIBILITY	20
37B	EXPOSURE	DISTANCE TO POPULATION	5
37C		POTENTIAL EXPOSURE	LINES 37A x 37B
38		LIKELIHOOD SCORE	LINES 36 + 37C
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
40	DIRECT CONTACT	POPULATION - 1 MILE	10
41	TARGETS	NEAREST RESIDENCE	0
42		RECREATIONAL USE	0
43		TARGETS SCORE	SUM LINES 40 THRU 42
44		DIRECT CONTACT SCORE	LINES 38 x 39 x 43
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE		0.03
	(LINES 10 + 24 + 35 + 44) / 100,000		

SITE NAME:

New Jay Gould Mill

PA NUMBER:

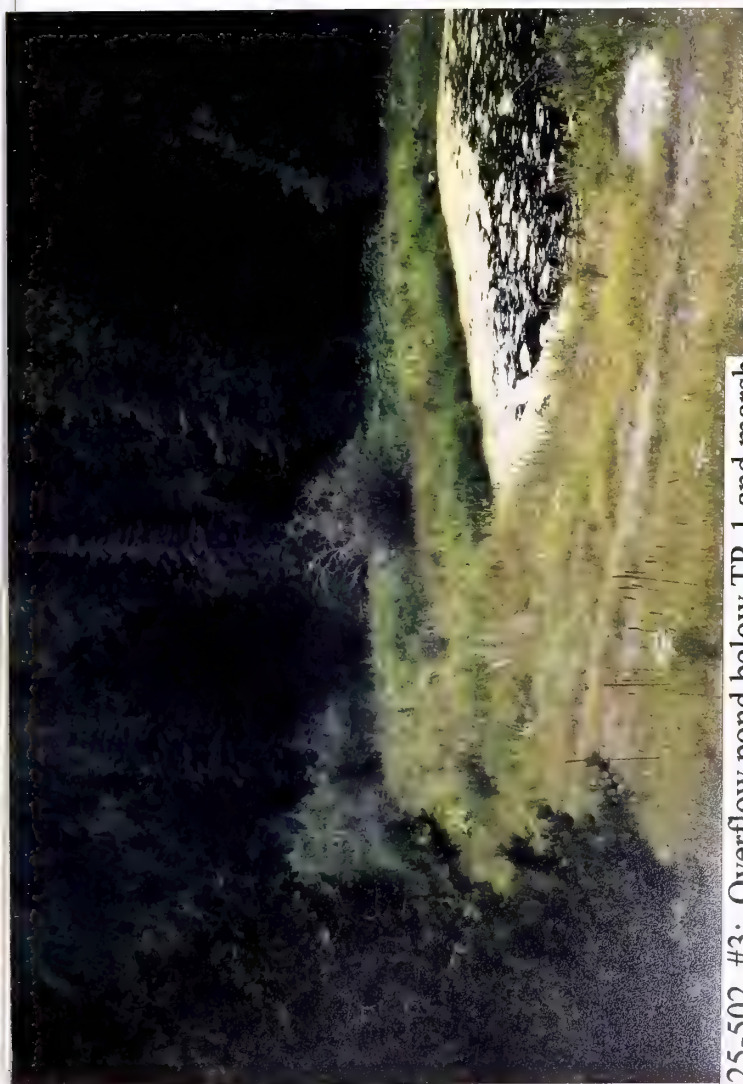
25-502

LINE
NO.SITE SAFETY

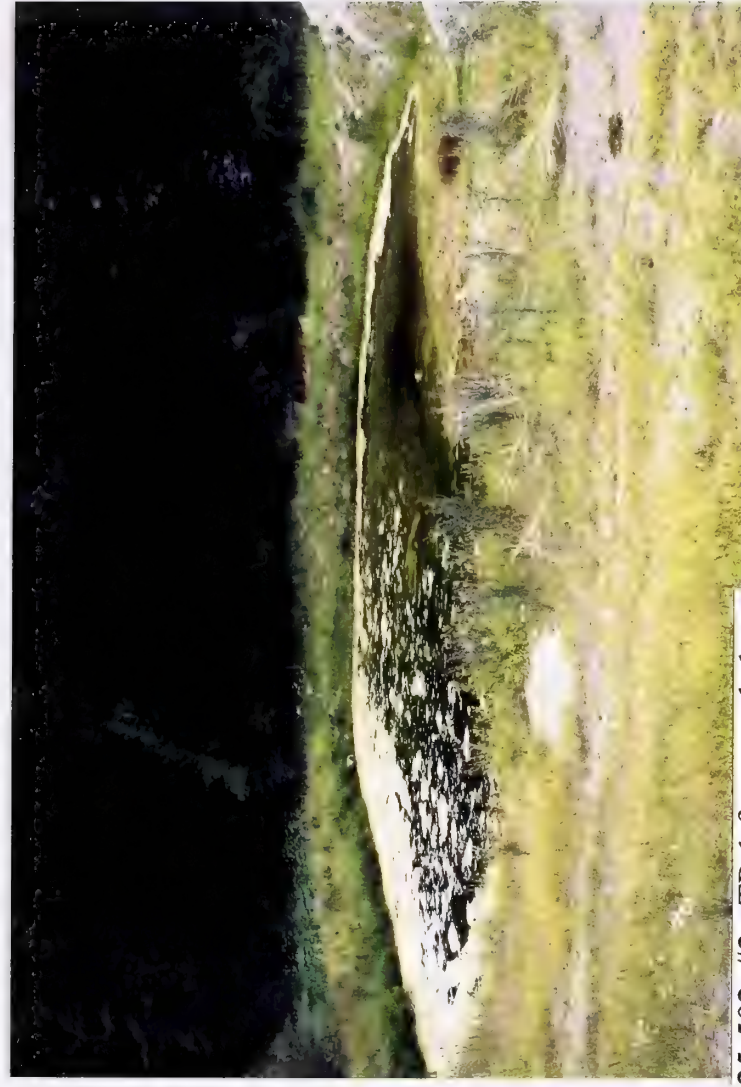
1	THREAT	ACCESSIBILITY		20
2		OPEN SHAFTS	100 EA.	0
3		OPEN ADITS	50 EA.	0
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	0
5		HAZ. STRUCTURES	40 EA.	120
6		EXPLOSIVES		100
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 THRU 7	220
9		POPULATION - 1 MILE		10
10	TARGETS	NEAREST RESIDENCE		0
11		RECREATIONAL USE		0
12		TARGETS SCORE	SUM LINES 9 THRU 11	10
13		SITE SAFETY SCORE	(LINES 1 x 8 x 12) / 1,000	44.00



25-502, #1: Mill building



25-502, #3: Overflow pond below TP-1 and marsh



25-502, #2: TP-1 from road above



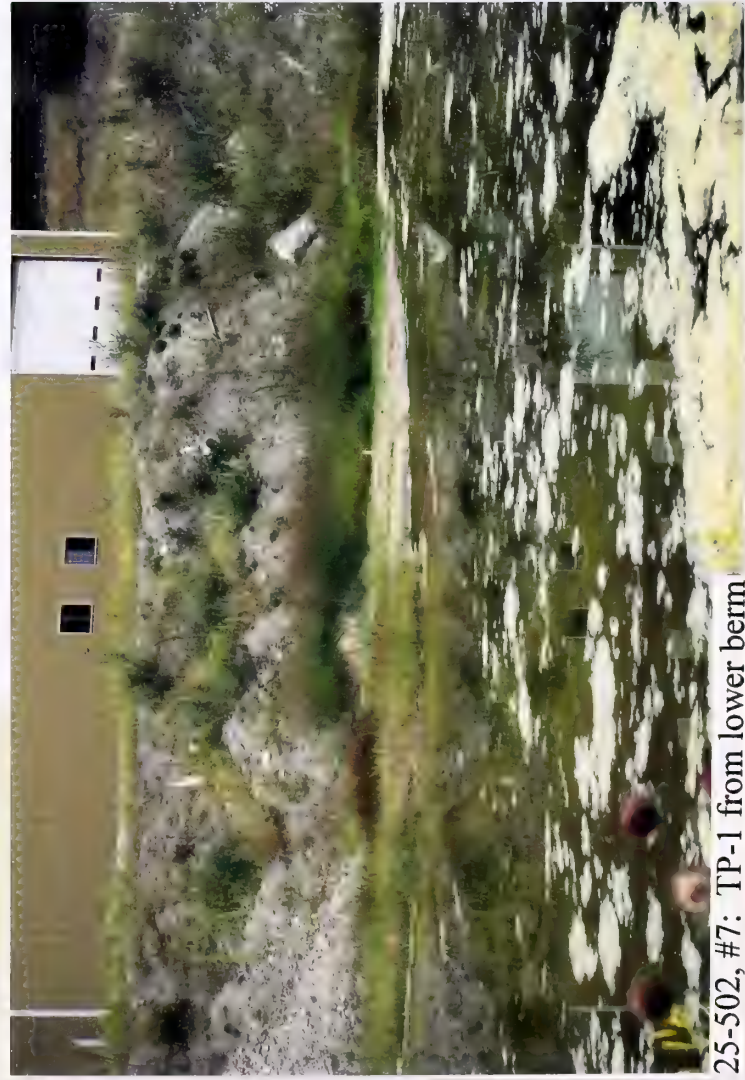
25-502, #4: SW-3 sample location



25-502, #5: SW-2 sample location



25-502, #6: SW-1 sample location



25-502, #7: TP-1 from lower berm



MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: GARNET GOLD MINE PA#: 29-035

Date: July 8, 1994 Time: 0915-1710

Field Team Leader: Flammang, Pioneer

Sampling Personnel: Belanger, West; Pioneer

Visitors: Unidentified hiker

Weather/Seasonality Observations: Sunny; warm to hot (70° to 90°F); calm.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #1: Shaft #Aa and associated pit facing south and east (Note: Undercaving); #2: Shaft #Aa and associated pit facing west and north; #3: WR-3B (foreground) and WR-3A (background) facing north; #4: Adit #2 with highwall facing north; #5: WR-4 from road; #6: Adit discharge facing north, AD-1 sample location; #7: WR-1 (subsample locations A, B, and C on right, subsample location D on left) and Adit #1 (center) facing east; #8: SE-1 sample location on Cataract Creek facing toward reservoir dam; #9: TP-1A sample location facing toward creek (Note: Tailings under water on left); #10: TP-1B sample location facing upgradient on Cataract Creek; #11: TP-1C sample location just above breached dam, Cataract Creek at toe facing west; #12: Facing southeast at breached dam below TP-1C.
Video Tape No. 2

General Comments/Observations (not covered specifically in attached Inventory Forms): Site is just below Cataract Creek Reservoir. A mercapten stench cartridge was connected to piping leading into the lower adit (#1); the area near the adit mouth smelled like natural gas.

Other Hazardous Materials/Substances Present: Two green 55 gal. drums; one is 1/4 full and labeled "Fleet Heavy Duty Motor Oil", other drum is 1/3 to 1/2 full with no label but possibly the same as the first drum. One red 55 gal. drum approx. 1/3 full of unknown liquid that smells like hydrocarbons.

General Comments on Potential Remedial Alternatives: Reroute and possibly treat adit discharge. Wetlands already present may be "treating" existing problems. Unvegetated tailings impoundment below the mine should be removed from the floodplain and amended/revegetated to reduce further migration of tailings.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): GARNET GOLD MINE PA#: 29-035

Legal Description: T 2S ; R 3W ; Sec. 23 , SE 1/4 1/4 1/4

County: MADISON Mining District: PONY

Latitude: N 45° 38' 42" Longitude: W 111° 56' 07"

Primary Drainage Basin and Code: North Willow Creek/10020005

Secondary Drainage Basin: Cataract Creek

USGS Quadrangle map name(s): Pony

Mine Type/Commodities: Hardrock/Gold, Copper, Silver, Zinc, Lead

Activity Status: Active , Inactive/Exploration X , Abandoned .

Ownership: Known Y N X ; private/public? Private

Owner, Agent, or Contact (Include address and phone when available): Unknown

Relationship to other mines/sites in the area/district: Unknown

Regulatory Status (Activity by other agencies)? Hardrock permits?
Past Reclamation Activities? N/A

General site features: Elevation 6200'-6880', Slope Mine, 25°;
Tailings, 5° , Aspect Mine, south; Tailings, southeast

Land use: Mining , Recreational X , Residential , Urban ,
Agricultural X , Other(Specify)

Area of disturbed/unvegetated lands? 11 acre(s) .

Site Dimensions: 200 feet x 300 feet (upper); 1,100 feet x 375
feet (lower)

Predominant vegetation types: Upper has Lodgepole pine; lower has
willow and sage.

Access: roads - good (paved) , poor (maintained dirt road) X ,
4wd X , trail .

Other logistical considerations (proximity to other sites). Steep,
narrow road to upper part of the site; Atlantic & Pacific Mine is
further up the road; 2.5 miles from Pony.

Well logs within 1 mile radius; (Attach MBMS Well Log Printout(s): There are 2
wells reported within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also
note presence of radioactive minerals). Site is underlain by quartz monzonite.
Garnet Gold Mine lies mostly on the north side of Cataract Creek.
Just above the site, Cataract Creek has been contained in a
reservoir. Water from the reservoir wells up along the length of
the tailings. Cataract Creek itself begins carrying water approx.
300 feet downgradient of the reservoir dam. Water flows east
through and away from the site to confluence with North Willow
Creek approx. 1/2 mile below the tailings dam. North Willow Creek
then flows northeast into Willow Creek.

Mining/milling history, ore type/tenor, host rock, gangue: Ore was
produced from two fissure veins in quartz monzonite.
Mineralization consists of quartz, galena, and auriferous pyrite;
most of the ore was oxidized. Reported to have produced 175,000
tons of ore by 1905.

Mine Operation?

Shafts - Yes X, No , # 1, Comment Open, large pit around
mouth

Adits - Yes X, No , # 2, Comment 1 discharging and gated;
1 open

Pits - Yes , No X, # , Comment

Placers - Yes , No X, # , Comment

Other - Yes , No X, # , Comment

Mill Operation? Yes X, No . If yes answer the next three
questions:

Period(s) of Operation: 1898 to 1905

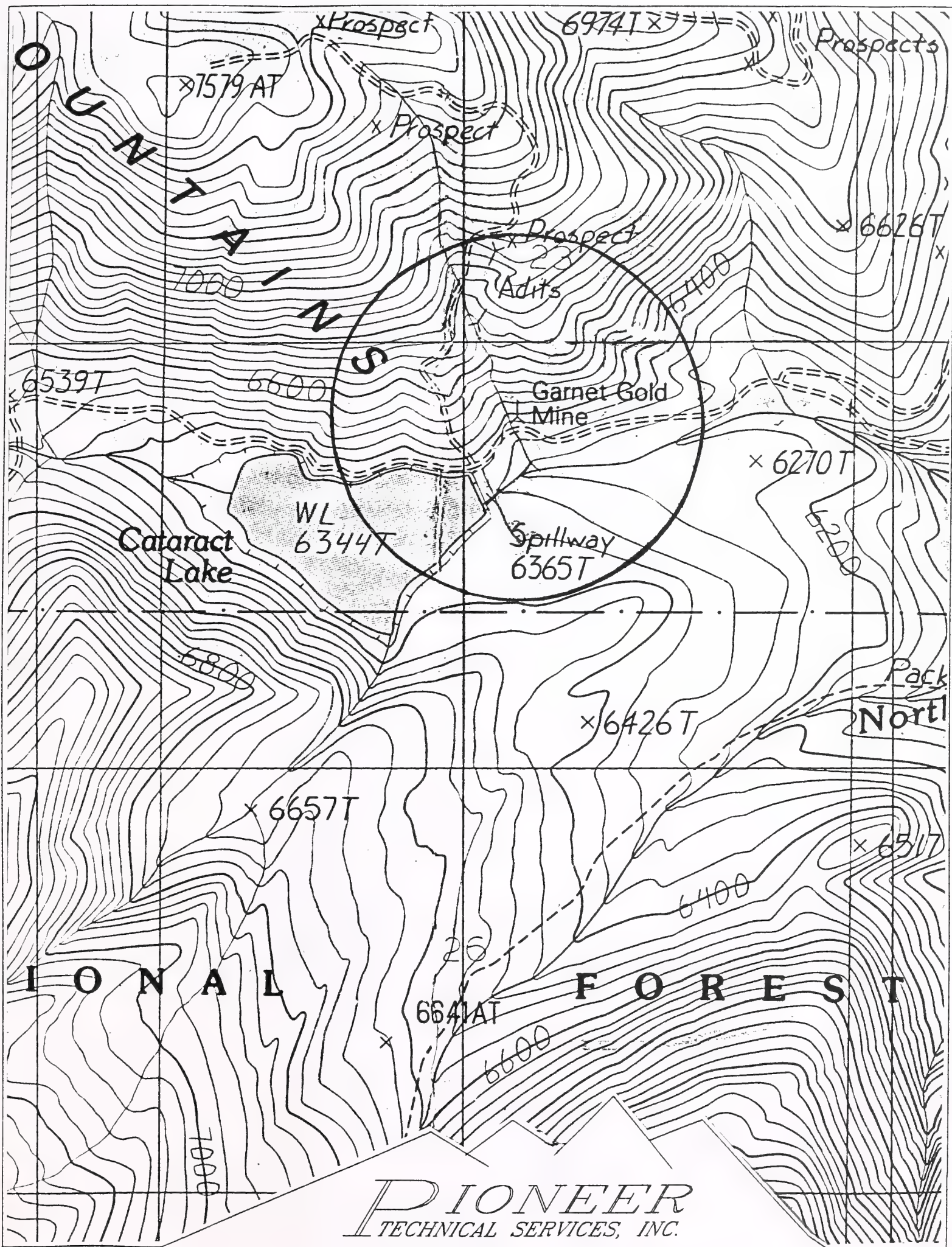
Origin of Ore Milled - Custom Mill Dedicated Mill ; Number and
names of mines that supplied mill feed: Unknown

Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting?
20-stamp mill equipped with True Vanners for concentration

Montana Bureau of Mines and Geology
Water Well Log Data

08/12/1994

Well No.	Location	Depth	Yield	Static Water Level
M:107280	02S 03W 13 DDD	340.0	15.0	23.00
M:122566	02S 03W 24	120.0	9.0	50.00



GARNET GOLD MINE, P.A. NO. 29-035
T02S, R03W, SECTION 23
SCALE: 1" = 1000'



DRAWN FOR:

PIONEER
TECHNICAL SERVICES, INC.

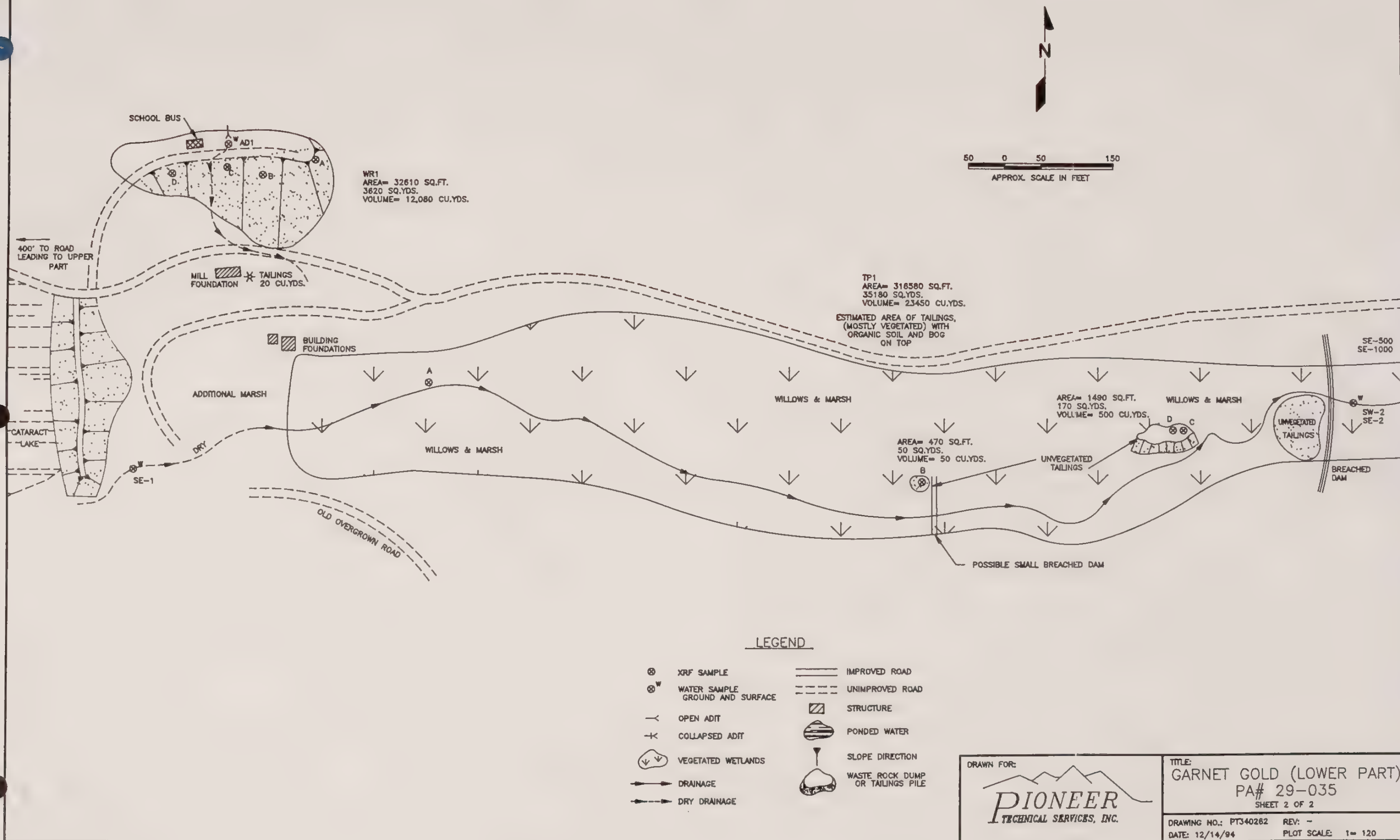
TITLE:

GARNET GOLD (UPPER PART)
PA# 29-035

SHEET 1 OF 2

DRAWING NO.: PT340281
DATE: 12/3/94

REV: -
PLOT SCALE: 1 = 80



II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): 100% medium orange to tan sand

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): No stratification observed. Tailings were approx. 2.5' deep at TP-1A; 700' further east they were 3' deep; 550' further east they were 9' deep. Beyond the lower breached dam, tailings were 1' deep in floodplain; 500' down they were approx. 6" deep. Below breached dam and in some places above dam, tailings are overlain by 0-4" of black loam and organics.

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): Wet; the majority of the tailings underlie a swamp or Cataract Creek. When tailings are above the water level, they become saturated at approx. 2' below ground level.

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): Possible small very breached dam below TP-1B; larger but still breached dam below TP-1C and TP-1D approx. 1,200' below the mill foundations.

Comments on potential for mitigation: Majority of the tailings are already 90% revegetated. If surface water is affected by high metal values in tailings, then removal and containment or rerouting Cataract Creek may be necessary.

SOURCE INVENTORY FORM

SAMPLERS: Flammang, Belanger, West

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd ³)	LOCATION/DESCRIPTION	CONTAINMENT	PH SU (D/S)	RADIO-ACTIVITY (MR/HR)	LAB. SAMPLE NO.	DATE/TIME	ANALYSES
WR-1A	WR	12,080	East end of WR-1; east facing slope, near top	None	6.1 (D)	0.04	29-035-WR-1	07/08/94 1830	T-Metals, ABA
WR-1B	WR		East of Adit #1; south facing slope, near top	None	4.5 (D)	0.055			
WR-1C	WR		South of Adit #1, east of adit discharge; near top of pile	None	4.6 (D)	0.055	29-035-WR-2	07/08/94 1835	T-Metals, ABA
WR-1D	WR		Small pile west of Adit #1; near top	None	6.4 (D)	0.045			
WR-3A	WR	3,610	Southwest of collapsed cabin on south face; west side, near top	None	5.8 (D)	0.03			
WR-3B	WR		South of collapsed cabin on south face; near top	None	6.0 (D)	0.07			
WR-4	WR	5,950	Southeast of Adit #2 on south face; east side, near top	None	5.0 (D)	0.07			
TP-1A	TAIL	23,450	Approx. 150' downgradient of mill foundations, north side of creek; 0-2.3', orange to tan sand	None	6.3 (D)	0.05	29-035-TP-1	07/08/94 2100	T-Metals, ABA
TP-1B	TAIL		Approx. 700' downgradient of TP-1A, 60' north of creek; 0-3', medium orange sand	Possible, small breached dam	6.6 (D)	0.045			
TP-1C-1	TAIL		Approx. 1,250' downgradient of TP-1A, north of creek on unvegetated bank; 0-3', medium orange to tan sand	Breached dam	5.2 (D)	0.05			
TP-1C-2	TAIL		3-9', medium to tan sand with bits of wood	Breached dam	4.8 (D)	0.04	29-035-TP-2	07/08/94 2110	T-Metals, ABA
TP-1D-1	TAIL		West of TP-1C, borehole; 0-5', medium orange to tan sand	Breached dam	6.2 (D)	0.03			
TP-1D-2	TAIL		5-9', medium orange to tan sand	Breached dam	5.8 (D)	0.04			
SS-1	SOIL	N/A	Background soil west of and across road from WR-3A	N/A	N/A	N/A	29-035-SS-1	07/08/94 1230	T-Metals

D-Direct reading (slurry meter); S-Saturated Paste (slurry meter)

Comments or deviations from SOPs: 29-035-WR-1 is composite of WR-1A through -1D. 29-035-WR-2 is composite of WR-3A and -3B, and WR-4. 29-035-TP-1 is composite of TP-1A, -1B, -1C-1, and -1D-1. 29-035-TP-2 is composite of TP-1C-2 and -1D-2. No WR-2 was identified during investigation. WR-4 appears to have been bulldozed in recent past.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes X, No , Number: 1 Identification: Adit #1

Filled shafts: Yes , No X, Number: Identification:

Seeps/Springs: Yes X, No , Number: Identification: The swamp below the Garnet Gold Mine just appears and is most likely associated with seeps from the reservoir.

Groundwater wells within 4 miles?: Yes X, No ;
Number of well logs: 96

Distance to nearest well used for drinking:
 <1,000 ft; 1,000 ft to 0.5 miles; X >0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite , Probable X, Possible , Unlikely .

Large uncontained source (tailings) with high lead values in contact with groundwater.

Approximate Depth to Groundwater: X <25 ft; 25 - 100 ft; >100 ft.

Other observations/notes: Tailings not underwater were saturated at approx. 2 feet below ground level.

SAMPLERS: Belanger

[illegible]

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes X, No , Name(s): Cataract Creek has flow approx. 300' below the reservoir face. Cataract Creek just below the reservoir dam was dry during this investigation.

Dry streambeds: Yes X, No , Name(s): Unnamed tributary to Cataract Creek

Other surface water: Yes X, No , Name(s)/Description: Cataract Creek Reservoir is just west of the mill and mine. Swamp associated with Cataract Creek begins approx. 200' below the reservoir face.

Waste materials within any floodplain: Yes X, No Source ID(s): TP-1 is in floodplain of Cataract Creek. WR-3 and WR-4 are in dry drainage with evidence of erosion during storm events.

Approximate Flood frequency? X 1 yr, 10 yr, 100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? 4.6 cfs

High Flow: 20 cfs, **Average Flow:** 4 cfs

Distance between waste source(s) and nearest surface water body (ft)? 0 feet; Cataract Creek flows over TP-1 and swamp is underlain by tailings (TP-1). 0 feet; Adit discharge flows over WR-1.

Surface water draining onto or through waste sources: Yes X, No , Describe: Cataract Creek flows over TP-1; swamp is underlain by tailings (TP-1); adit discharge flows over WR-1; water flowing in dry drainage during storm events flows over WR-3 and WR-4, as evidenced by channel.

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Irrigation, agriculture

Observed erosional/sedimentation/stream turbidity problems? Yes X, No . Distance downstream (ft)? 0-500 ; 500-1,000 ; >1,000 X. Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): Tailings were present in stream channel at 1,000' sample point; floodplain at 500' sample point is underlain by 6-8" of tailings. Approximately 2,000' below lowest breached dam, the valley narrows and gradient steepens; little evidence of tailings present there.

SAMPLERS: Flamman

[illegible]

FLOW: Estimated (M) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): Stream channel at SE-1 was dry during investigation, only sediment sample was taken.

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO₃)

Presence of evaporative salt deposits? (ESD)

Discolored or turbid seepage? (SPG)

Presence of long filamentous algae in drainages, mosses in moist areas?

Presence of ferric hydroxide precipitates? (FEOX)

Presence of burned or stressed vegetation? (VEG)

$pH \leq 5.0$ (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? Approximately 10 acres in floodplain of Cataract Creek; approximately 6 acres are already underlain by tailings.

Wetlands present: Yes X, No , **Describe:** Swamp present for approximately 1,000' on the north side of Cataract Creek (1,000' (150')).

Carbonate rocks/soils: Yes____, No X, Describe:_____

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10___; 10-30___; 30-100 X;
100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or
greater___; Comments_____

Nearest residence: <1,000 ft; 1,000 ft - 0.5 miles; X >0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:

observed	high	moderate	low	none
----------	------	----------	-----	------

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Flammang, Belanger, West

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (G.I.P.S.)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH/MODERATE/LOW/NONE)
WR-1	SO3; pH	Partial	32,610	30,980	Yes	Low
WR-3	None	Dry	8,140	8,140	Yes	Low
WR-4	None	Dry	20,990	20,990	Yes	Low
TP-1	pH; SPG	Wet	316,580	31,658	Yes	Low

Notes and Clarifications: _____

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X,
Describe: _____

Population within 1 mile: 1-10____; 10-30____; 30-100____; 100-300____;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____;
Comments None

Evidence of recreational use on site: Yes X, No____, Describe: Hiker
visited site during investigation; fishermen and boaters on Cataract
Creek Reservoir during investigation.

Accessibility (check each that apply): X Easily accessible - no fences,
gates, or warning signs;____ Moderately Accessible - barbed wire fences,
road gated, or signs posted;____ Difficult Access - chain-link fence,
road gated and locked, site guarded (does not include locked or manned
access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment_____
Wilderness Area - Yes____, No X, Comment_____
T&E Species Habitat - Yes____, No X, Comment_____
Bat Habitat - Yes X, No____, Comment Possible, open adits

Primary Drainage X; Secondary Drainage____; No Information____:

Riparian Habitat Quality - High____, Medium X, Low____

Wetlands Frontage - High____, Medium X, Low____

Fisheries Habitat and Species Classification - 3

Sport Fishery Classification - 4

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes X, No____, Number 3, types and locations:
Adit #1 gated with Mercapten stench cartridge, but could be accessed;
Adit #2 opening has been partially closed by bulldozer, but still
accessible; adit or shaft at base of Shaft AA.

Hazardous structures: Yes____, No X, Number____, types and locations:____

Unstable highwalls, pits, trenches, slopes: Yes X, No____, Number 1,
types and locations: Caving of walls of large deep pit associated with
Shaft AA

Unstable waste piles, impoundments, undercut banks: Yes X, No____,
Number 2, types and locations: TP-1, near TP-1C, is being undercut by
Cataract Creek (approximately 6' tall); WR-1 is steep, unvegetated, and
at angle of repose.

Fire and/or Explosion hazards: Yes X, No____, Explain: Possible fire or
explosion from possible hydrocarbons in red drum.

Bibliography

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0,
Prepared by Montana Natural Resource Information System, December
1989.

MDSL/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for
Garnet Gold Mine, Prepared by Northern Engineering and Testing,
September 6, 1988.

MDSL/AMRB Files, Abandoned Mine Reclamation Portal Inventory Form for
Garnet Gold Mine, Prepared by Daphne Digrindakis, July 17, 1985.

USBM, Gold Lode Mining in the Tobacco Root Mountains, Madison County,
Montana, Information Circular 6972, Written by S.H. Lorain,
November 1937.

USGS, Topographic Map, Pony, Montana, 7 1/2 minute Quadrangle, 1988.

LABORATORY ANALYTICAL DATA

**GARNET GOLD MINE
PA NO. 29-035**

Garnet Gold Mine PA# 29-035
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - TUESDAY
INVESTIGATION DATE: 07/09/94

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	Ag (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
29-035-SE1	0.4 U	3.9 U	26.6	0.4 U	1.4	2.8	4.9	5740	0.02 UJ	468	2.0	15.4	4.3 U	18.4	NR
29-035-SE2	0.7	5.9 U	75.5	0.6 U	1.9 U	2.5	149	5470	0.24 J	45.5	1.8 UJ	861	6.6 U	46.4	NR
29-035-TP1	8.1	5.8 U	196	0.6 U	1.9 U	1.0 U	306	9170	0.76 J	79.9	1.8 UJ	2160	6.5 U	109	NR
29-035-TP2	14.6	4.5 U	471	0.4 U	1.5 U	0.8 U	1290	10200	0.82 J	41.4	1.4 UJ	5380	5.0 U	110	NR
29-035-WR1	1.2	5.4 U	77.2	0.5 U	2.6	1.0 U	194	15900	0.29 J	1240	1.6 UJ	515	6.0 U	80.6	NR
29-035-WR2	0.5 U	5.1 U	42.4	0.5 U	2.4	1.4	105	7730	0.34 J	842	1.5 UJ	351	5.7 U	69.4	NR
BACKGROUND	0.6 U	5.9 U	140	0.6 U	3.6 B	9.2	12.3	11000	0.06 J	735	4.7 B	34.0	6.6 U	55.5	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL. POTENT.		SULFUR ACID BASE		PYRITIC SULFUR		ORGANIC SULFUR		PYRITIC SULFUR		SULFUR ACID BASE POTENT.	
	%	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t
29-035-TP1	0.12	3.75	0.06	0.06	-3.7	0.12	<0.01	0.00	<0.01	0.00	0.00	0.06		
29-035-TP2	0.25	7.81	0.56	0.56	-7.3	0.2	0.03	0.94	0.02	0.94	-0.38			
29-035-WR1	0.29	9.06	3.53	3.53	-5.5	0.22	0.01	0.31	0.06	0.31	3.22			
29-035-WR2	0.05	1.56	6.27	6.27	4.71	0.02	0.01	0.31	0.02	0.31	5.96			

WATER MATRIX ANALYSES

Metals in Water
Results in ug/L

FIELD ID	Ag	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
29-035-AD1	0.12 U	1.2	27.2	8.2	8.7 U	4.7 U	205	241	0.11 U	4000	8.0 U	43.5 J	34.0 JX	440 JX	227
29-035-SW2	0.12 U	1.1 U	25.0	2.6 U	8.7 U	4.7 U	4.6 U	124	0.11 U	136	8.0 U	19.6 J	29.4 UX	4.9 JX	33.9

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Wet Chemistry
Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
29-035-AD1	343	<5.0	157	0.11	NR
29-035-SW2	25	<5.0	<5.0	0.14	NR

LEGEND

SE1 - Upgradient of site, approx. 30' below reservoir dam line.
SE2 - Downgradient of lowest breached dam approx. 30'
TP1 - Composite of subsamples TP1A, 1B, 1C-1, and 1D-1.
TP2 - Composite of subsamples TP1C-2 and 1D-2.
WR1 - Composite of subsamples WR1A through 1D.
WR2 - Composite of subsamples WR1A, 1B, and 4.
BACKGROUND - From the Garnet Gold Mine (29-035-SSI).

AD1 - Discharge from site #1.
SW2 - Same as sample 29-035-SE2.

XRF ANALYSIS RESULTS

**GARNET GOLD MINE
PA NO. 29-035**

XRF Field Analyses

Results in PPM

XRF SAMPLE I.D.	CrHI	K	Ca	Ti	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Sr
29-035-SE1000		15684.1	5116.02	789.012			12432.9			238.662 *			154.677
29-035-SE500		11445	4059.37	561.26 *			7706.94			87.9397 *	79.4312 *		205.674
29-035-TP1A		36956.3	1834.78	640.28 *			16768.1			380.832	133.051 *		112.454
29-035-TP1B		22765.5	2068.55		675.785 *		7311.67			183.036 *			88.9921
29-035-TP1C1		40052.6	2913.64	404.858 *	802.782 *		10724.5			175.948 *	380.594		114.735
29-035-TP1C2		31666	3178.11		965.253 *		15940.2			2922.1	126.275 *		117.316
29-035-TP1D1		27462.2	2213	494.3 *			11486.9			287.814 *			100.159
29-035-TP1D2		18713.3	1802.24	319.968 *			7972.2			239.79 *	72.7585 *		95.4568
29-035-TP1-COMP		26875.5	2256.01	644.281 *			11803.9			279.069 *	116.405 *		89.166
29-035-TP2-COMP		28330.7	2079.16	808.304			11290.3			916.737	78.7176 *		107.045
29-035-WR1A		21231.16	7990.81	969.633		3646.88	25161.6			382.041	96.1267 *		230.044
29-035-WR1B		26517.5	9648.46	725.627 *		645.115 *	33301.7			508.055	123.473 *		162.428
29-035-WR1C		39663.8	3503.57	1656.49			30656.1			104.694 *	92.7195 *		90.8753
29-035-WR1D		24187.3	11267.9	2787.33		1249.83 *	26672.1			87.2506 *	95.5789 *		368.952
29-035-WR1-COMP		25879.4	6886.31	833.288		1127.75 *	28953.5			254.047 *	100.679 *		243.559
29-035-WR2-COMP		26035.1	7168.85	816.279		956.737 *	30310.7			265.301 *	83.4165 *		250.694
29-035-WR3A		23302.3	7938.75	984.223		1841.31 *	26101.9			78.4019 *	183.259 *		360.678
29-035-WR3B		23919.8	13925.7	1159.11		1275.72 *	17588.5				70.4817 *		663.113
29-035-WR4		16330	4968.88	480.346 *		1980.48 *	21636.7			363.55	99.6376 *		219.257

XRF SAMPLE I.D.	Zr	Hg	Mo	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th
29-035-SE1000	77.7877			914.527	137.918				401.188			13.5314 *
29-035-SE500	55.0331			363.04	92.215				409.032			49.8376 *
29-035-TP1A	28.6951 *		44.6677	4438.28	176.699				834.654			27.1712 *
29-035-TP1B	26.6342	52.1434 *	19.3656 *	934.426	133.547				494.818			32.6973 *
29-035-TP1C1	44.3162		21.6191 *	2121.94	244.372			52.6196 *	789.262			104.516 *
29-035-TP1C2		192.433 *	53.4075	12599	199.171				1032.62			28.4685 *
29-035-TP1D1	44.0447		22.4993 *	2337.08	143.143				574.897			20.8905 *
29-035-TP1D2	33.8753		20.1184 *	1733.97	124.106				1034.43			21.331 *
29-035-TP1-COMP	37.112		36.6672	1703.81	134.438				586.134			19.6585 *
29-035-TP2-COMP	48.9529		25.1459 *	2928.77	157.396				994.074			
29-035-WR1A	101.196			199.588	162.769				753.155		27.937 *	
29-035-WR1B	85.2934		10.7026 *	1090.5	201.098				652.228			
29-035-WR1C	91.6961	58.0679 *	10.513 *	67.7797 *	251.986				317.37			15.4787 *
29-035-WR1D	194.081			108.591 *	144.757				425.347		22.3897 *	19.3802 *
29-035-WR1-COMP	112.407			376.011	207.076				730.444			
29-035-WR2-COMP	109.314			380.542	197.705				730.17			15.1261 *
29-035-WR3A	122.211				160.869				704.835			15.9766 *
29-035-WR3B	73.9474			52.3161 *	119.365				1463.16			20.8314 *
29-035-WR4	88.263		8.40754 *	802.43	135.908				340.117			16.9159 *

* = Estimated Quantity

\$ = Unvalidated Data

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**GARNET GOLD MINE
PA NO. 29-035**

AIMSS SCORESHEET

SITE NAME:
PA NUMBER:

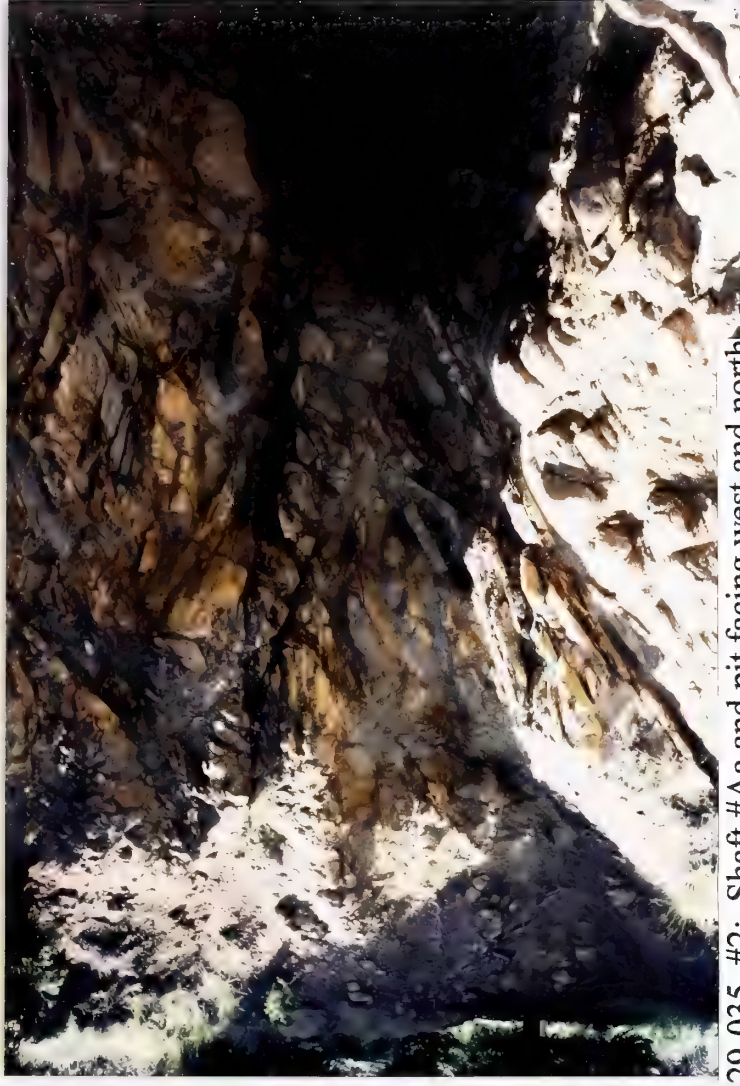
Garnet Gold
29-035

LINE NO.		GROUNDWATER PATHWAY	
1		OBSERVED RELEASE	0
2		EXCEEDENCES	0
3A	GW - LIKELIHOOD OF RELEASE	CONTAINMENT	20
3B		GW DEPTH	20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B 400
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C 400
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 85.567
6	GW - TARGETS	WELLS - 1 MI. x 2.5	5.0
7		WELLS - 1 TO 4 MI	94
8		NEAREST WELL	0
9		TARGETS SCORE	LINES 6 + 7 + 8 99.0
10		GROUNDWATER SCORE	LINES 4 x 5 x 9 3388453
		SURFACE WATER PATHWAY	
11		OBSERVED RELEASE	300
12	SW - LIKELIHOOD OF RELEASE	EXCEEDENCES	0
13A		CONTAINMENT	20
13B		DISTANCE TO SW	20
13C		POTENTIAL TO RELEASE	LINES 13A x 13B 400
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C 700
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 94.211
16	SW - TARGETS	DRINKING WATER POP'N	0
17		IMPACTED DRAINAGE	1
18		WETLANDS	10
19		FISHERY	5
20		RECREATION	0
21		IRRIGATION/STOCK	2
22		T & E SPECIES HABITAT	0
23		TARGETS SCORE	SUM LINES 16 THRU 22 18
24		SURFACE WATER SCORE	LINES 14 x 15 x 23 1187059
		AIR PATHWAY	
25		OBSERVED RELEASE	0
26A	AIR - LIKELIHOOD OF RELEASE	CONTAINMENT	5
26B		DISTANCE TO POPULATION	5
26C		POTENTIAL TO RELEASE	LINES 26A x 26B 25
27		LIKELIHOOD SCORE	LINES 25 + 26C 25
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 0.329
29	AIR - TARGETS	POPULATION - 4 MILES	30
30		NEAREST RESIDENCE	0
31		WETLANDS	10
32		PARKS / WILDERNESS	0
33		T & E SPECIES HABITAT	0
34		TARGETS SCORE	SUM LINES 29 THRU 33 40
35		AIR PATHWAY SCORE	LINES 27 x 28 x 34 329
		DIRECT CONTACT PATHWAY	
36		OBSERVED EXPOSURE	50
37A	LIKELIHOOD OF EXPOSURE	ACCESSIBILITY	20
37B		DISTANCE TO POPULATION	5
37C		POTENTIAL EXPOSURE	LINES 37A x 37B 100
38		LIKELIHOOD SCORE	LINES 36 + 37C 150
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 0.298
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE	0
41		NEAREST RESIDENCE	0
42		RECREATIONAL USE	10
43		TARGETS SCORE	SUM LINES 40 THRU 42 10
44		DIRECT CONTACT SCORE	LINES 38 x 39 x 43 447
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE		(LINES 10 + 24 + 35 + 44) / 100,000 45.76

LINE NO.				SITE NAME:	Garnet Gold
				PA NUMBER:	29-035
	<u>SITE SAFETY</u>				
1	THREAT	ACCESSIBILITY			20
2	HAZARDS	OPEN SHAFTS	100 EA.		100
3		OPEN ADITS	50 EA.		100
4		UNSTAB. HIWALLS / PITS	75 EA.		75
5		HAZ. STRUCTURES	40 EA.		0
6		EXPLOSIVES			100
7		HAZ. MATERIALS			50
8		HAZARDS SCORE	SUM LINES 2 THRU 7		425
9	TARGETS	POPULATION - 1 MILE			0
10		NEAREST RESIDENCE			0
11		RECREATIONAL USE			10
12		TARGETS SCORE	SUM LINES 9 THRU 11		10
13		SITE SAFETY SCORE	(LINES 1 x 8 x 12) / 1,000		85.00



29-035, #1: Shaft #Aa and pit facing south and east
(Note: Undercaving)



29-035, #2: Shaft #Aa and pit facing west and north



29-035, #3: WR-3A (background) and WR-3B
(foreground) facing north



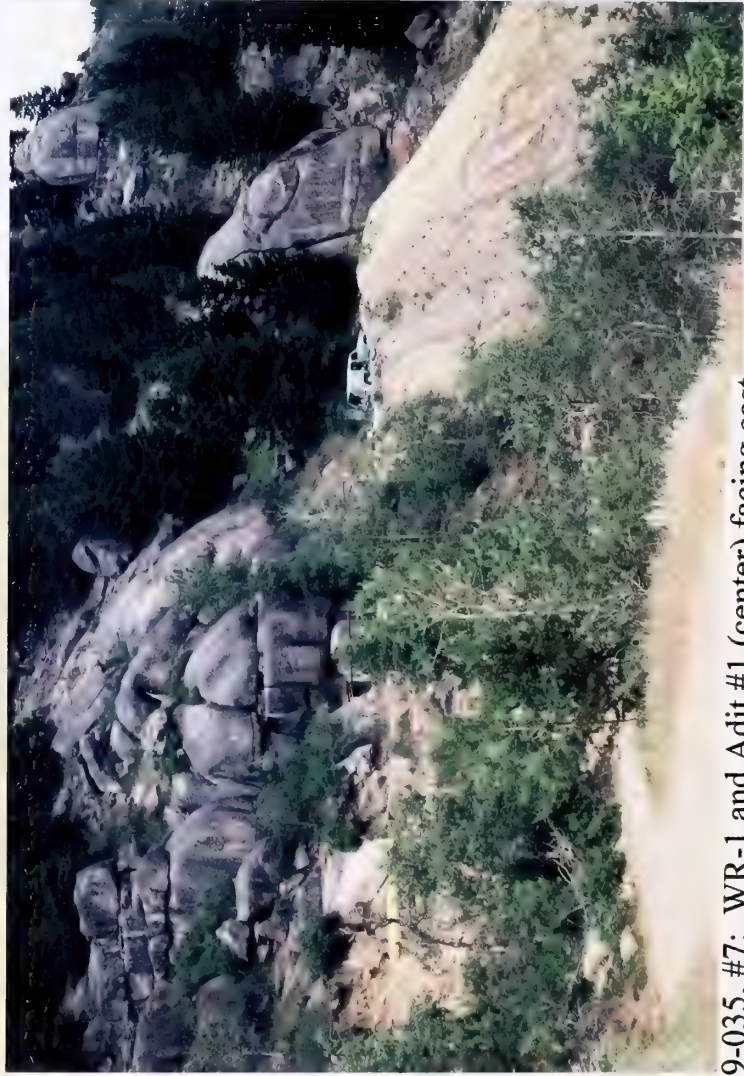
29-035, #4: Adit #2 with highwall facing north



29-035, #5: WR-4 from road



29-035, #6: AD-1 sample location facing north



29-035, #7: WR-1 and Adit #1 (center) facing east



29-035, #8: SE-1 sample location facing toward dam



29-035, #9: TP-1A sample location facing creek
(Note: Tailings under water on left)



29-035, #10: TP-1B sample location facing upgradient



29-035, #11: TP-1C sample location above breached dam
facing west



29-035, #12: Facing southeast toward breached dam
below TP-1C

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: CHICAGO MINING CORP. PONY MILLSITE PA#: 29-500

Date: August 11, 1994 Time: 1000-1100

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Belanger, West; Pioneer

Visitors: None

Weather/Seasonality Observations: Sunny; warm (80°-85°F);
occasional slight breeze.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #6-#8: Panorama of
Pony Mill from above. Video Tape No. 3

General Comments/Observations (not covered specifically in attached Inventory Forms):
No samples were collected at the site because crew was unable to
enter premises. Surface water and groundwater data from self-
monitoring for hardrock permit was collected 07/10/94. Pond liner
system composed of a 30 mil HDPE and a 30 mil VLDPE with a crushed
rock/felt interface and leak detection. Wildlife (deer) were
observed on the site. The MDHES/WOB and Chicago Mining Corp. have
detected cyanide releases to groundwater in the downgradient spring
and the Zimmerman well. Cyanide was first detected November 1,
1994, and was confirmed with follow-up tests conducted on November
30, 1994. Levels detected do not exceed drinking water standards
at this time. The WOB has given Chicago Mining until October 1,
1995, to repair the leak in the liner system and neutralize the
cyanide in the tailings.

Other Hazardous Materials/Substances Present: Possible cyanide
tanks within the mill; waste oil barrels.

General Comments on Potential Remedial Alternatives: Mill will
possibly be reactivated. Reclamation plan with operating plan
approved by MDSL/Hardrock Bureau. Liner leak must be repaired
quickly. Provide bottled water to the Zimmerman's until cyanide
concentrations peak and return to normal.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): CHICAGO MINING CORP. PONY MILLSITE PA#: 29-500

Legal Description: T 2S ; R 3W ; Sec. 13 , SE 1/4 SE 1/4 1/4
T 2S ; R 2W ; Sec. 18 , SW 1/4 SW 1/4 1/4

County: MADISON Mining District: PONY

Latitude: N 45° 39' 27" Longitude: W 111° 54' 17"

Primary Drainage Basin and Code: North Fork Willow Creek/1002005

Secondary Drainage Basin: North Fork Willow Creek

USGS Quadrangle map name(s): Pony

Mine Type/Commodities: Millsite/Gold

Activity Status: Active , Inactive/Exploration X , Abandoned .

Ownership: Known Y X N ; private/public? Private

Owner, Agent, or Contact (Include address and phone when available): Chicago Mining Corp., 85 W. Algonquin Rd., Suite 100, Arlington Heights, IL 60005.

Relationship to other mines/sites in the area/district: Approx. 0.25 mile from the town of Pony; A&P mine is 5 miles west; Strawberry mine 2 miles west; Garnet Gold 1.5 mile southeast.

Regulatory Status (Activity by other agencies)? Hardrock permits?
Past Reclamation Activities? MDSL Hardrock Permit

General site features: Elevation 5800'-5900', Slope 20°,
Aspect South

Land use: Mining X , Recreational , Residential , Urban ,
Agricultural X , Other (Specify)

Area of disturbed/unvegetated lands? 14 acre(s) .

Site Dimensions: 600 feet x 1,000 feet

Predominant vegetation types: Grasses and prairie brush, Engelmann spruce, willows

Access: roads - good (paved) , poor (maintained dirt road) X ,
4wd , trail .

Other logistical considerations (proximity to other sites) . The town of Pony is east of the site, over the knob.

Well logs within 1 mile radius; (Attach MEMG Well Log Printout(s): There are 72 wells reported within a 1 mile radius; 1 was sampled by Chicago Mining Corp.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). The mill lies in a small, flat bottomed saddle cut into the north dipping Pony gneiss. The project area lies on the divide between North Willow and Pony Creek. A streamflow gaging station exists on the Willow Creek near Harrison. North Willow Creek flows 4 miles to confluence with Willow Creek. Willow Creek flows 10 miles to the Willow Creek Reservoir.

Mining/milling history, ore type/tenor, host rock, gangue: The mill is designed to process up to 500 tons of ore per day with an anticipated project life of 10 years. Milling started in 1990 and continued until 1991.

Mine Operation?

Shafts - Yes___, No X, # ___ , Comment _____
Adits - Yes___, No X, # ___ , Comment _____
Pits - Yes___, No X, # ___ , Comment _____
Placers - Yes___, No X, # ___ , Comment _____
Other - Yes___, No X, # ___ , Comment _____

Mill Operation? Yes X, No _____. If yes answer the next three questions:

Period(s) of Operation: 1990 to 1991

Origin of Ore Milled - Custom Mill X **Dedicated Mill** ____; **Number and names of mines that supplied mill feed:** Ore is being brought to the mill from various mines, some owned by Chicago Mining Corp. and other owners (Mary El and Oregon).

Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting? A custom floatation and cyanide vat leach mill; heavy metal stabilization is a consideration in the disposal process by mixing the tailings with lime, fly ash, or other alkaline material during the milling process.

Montana Bureau of Mines and Geology
Water Well Log Data

08/12/1994

Well No.	Location	Depth	Yield	Static Water Level
M:107280	02S 03W 13 DDD	340.0	15.0	23.00
M:135207	02S 02W 07 DA	172.0	14.0	33.00
M:107236	02S 02W 07 DD	125.0	10.0	38.00
M:107248	02S 02W 17	50.0	8.0	14.00
M:107249	02S 02W 17 A	150.0	5.0	15.00
M:28795	02S 02W 17 CB	200.0	15.0	39.00
M:107254	02S 02W 18	23.0	5.0	0.00
M:107266	02S 02W 18	55.0	20.0	4.00
M:107270	02S 02W 18	185.0	8.0	43.00
M:107262	02S 02W 18	0.0	0.0	0.00
M:107257	02S 02W 18	0.0	1.0	15.00
M:107268	02S 02W 18	43.0	15.0	16.00
M:107253	02S 02W 18	36.0	22.0	30.00
M:107260	02S 02W 18	42.0	10.0	0.00
M:127941	02S 02W 18	178.0	6.0	34.00
M:107261	02S 02W 18	42.0	0.0	5.00
M:107269	02S 02W 18	125.0	20.0	60.00
M:107255	02S 02W 18	26.0	6.0	0.00
M:107259	02S 02W 18	0.0	0.0	0.00
M:107251	02S 02W 18	40.0	15.0	12.00
M:107265	02S 02W 18	200.0	2.0	0.00
M:107267	02S 02W 18	74.0	15.0	16.00
M:107271	02S 02W 18	80.0	10.0	32.00
M:107252	02S 02W 18	38.0	40.0	6.00
M:107263	02S 02W 18	40.0	20.0	40.00
M:107256	02S 02W 18	46.0	1.0	0.00
M:107258	02S 02W 18	34.0	10.0	11.00
M:107250	02S 02W 18	35.0	15.0	12.00
M:107272	02S 02W 18 A	187.0	6.0	32.00
M:135210	02S 02W 18 AB	121.0	31.0	22.00
M:107273	02S 02W 18 AC	83.0	18.0	42.00
M:107276	02S 02W 18 BA	8.0	1.0	0.00
M:107264	02S 02W 18 C	185.0	10.0	0.00
M:107277	02S 02W 18 CAD	130.0	20.0	65.00
M:107279	02S 02W 18 CC	14.0	10.0	6.00
M:107278	02S 02W 18 CCB	341.0	40.0	206.00
M:28796	02S 02W 18 CCB	75.0	0.0	31.40
M:107281	02S 02W 18 CCB	364.0	5.0	208.00
M:28859	02S 02W 18 CCB	220.0	0.0	202.80
M:107283	02S 02W 18 CD	35.0	0.0	12.00
M:107282	02S 02W 18 CD	30.0	0.0	7.00
M:107284	02S 02W 18 CD	65.0	15.0	27.00
M:28861	02S 02W 18 CDA	60.0	35.0	23.00
M:8986	02S 02W 18 CDB	45.0	0.0	0.00
M:107287	02S 02W 18 D	60.0	50.0	20.00
M:107297	02S 02W 18 D	42.0	40.0	8.00
M:107285	02S 02W 18 D	0.0	30.0	16.00
M:107286	02S 02W 18 D	12.0	12.0	8.00
M:107288	02S 02W 18 D	55.0	55.0	8.00
M:107289	02S 02W 18 DA	47.0	0.0	17.00
M:107290	02S 02W 18 DAA	36.0	11.0	13.00
M:107291	02S 02W 18 DAB	26.0	4.0	4.00
M:107292	02S 02W 18 DAC	57.0	10.0	40.00
M:107293	02S 02W 18 DACA	20.0	15.0	12.00
M:107274	02S 02W 18 DB	69.0	15.0	28.00
M:107294	02S 02W 18 DB	51.0	50.0	50.00
M:107275	02S 02W 18 DB	12.0	20.0	4.00
M:107295	02S 02W 18 DBD	92.0	7.0	55.00

Montana Bureau of Mines and Geology
Water Well Log Data

08/12/1994

Well No.	Location	Depth	Yield	Static Water Level
M:107296	02S 02W 18 DBD	84.0	2.0	52.00
M:107299	02S 02W 18 DC	50.0	20.0	20.00
M:107298	02S 02W 18 DC	38.0	10.0	7.00
M:107300	02S 02W 18 DCA	160.0	8.0	0.00
M:107301	02S 02W 18 DCB	57.0	20.0	12.00
M:107302	02S 02W 18 DD	442.0	3.0	168.00
M:107303	02S 02W 18 DDA	35.0	20.0	8.00
M:39504	02S 02W 18 DDA	201.0	0.5	162.60
M:107305	02S 02W 18 DDB	45.0	25.0	40.00
M:107304	02S 02W 18 DDB	41.0	30.0	5.00
M:138726	02S 02W 18 DDB	40.0	15.0	9.00
M:107306	02S 02W 19 AB	18.0	20.0	0.00
M:107307	02S 02W 19 DDBA	40.0	8.0	23.00
M:107308	02S 02W 20 B	150.0	35.0	72.00

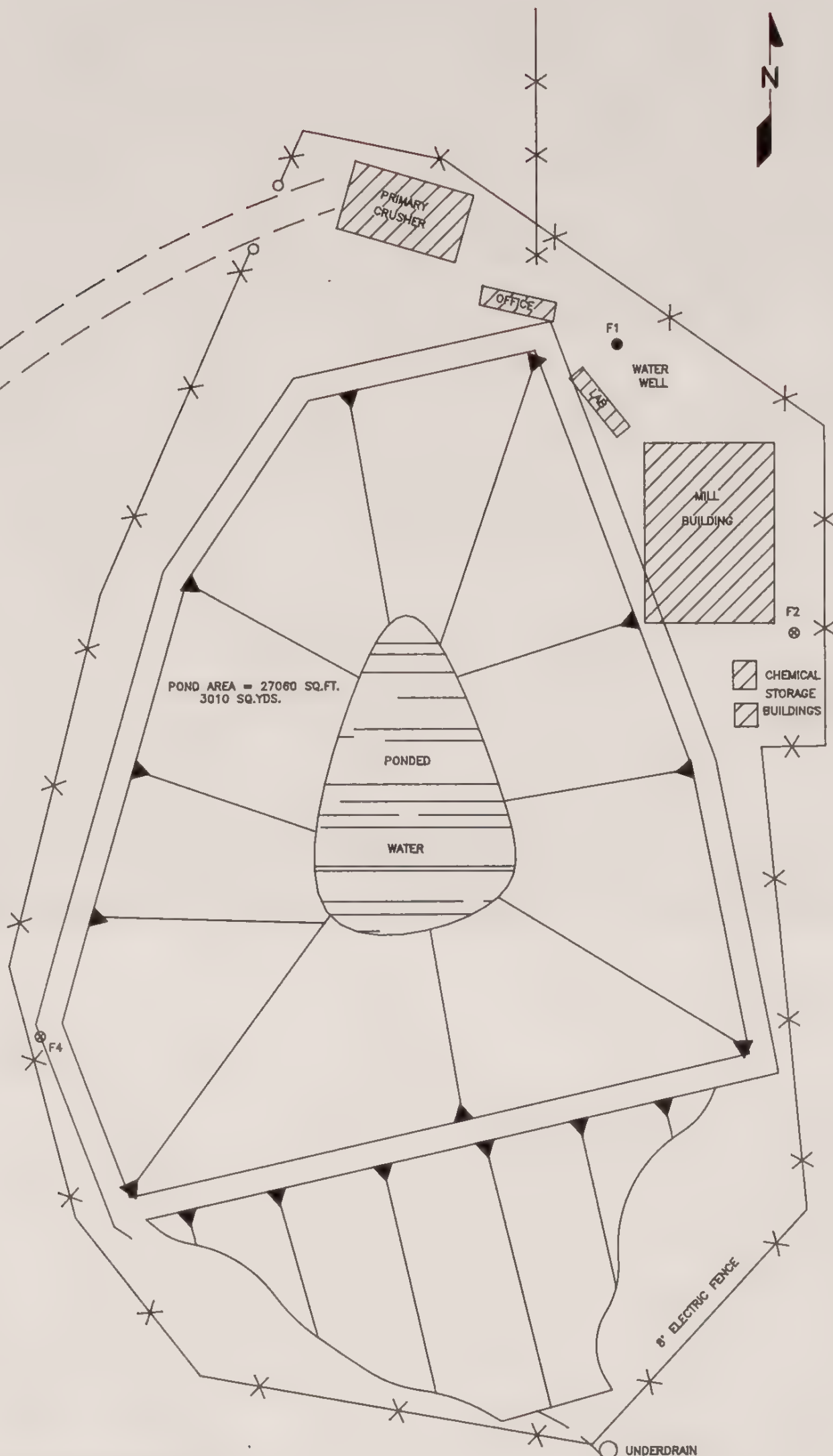


PIONEER
TECHNICAL SERVICES, INC.
CHICAGO MINING CORP. PONY MILLSITE,
P.A. NO. 29-500
T02S, R03W, SECTION 13
T02S, R02W, SECTION 18
SCALE: 1" = 1000'

EMPLOYEE ACCESS ROAD
GATED & LOCKED AT BOTTOM
(ACCESS THROUGH PONY)

LOCKED
GATE

HAUL ROAD
(FROM OVER BY GARNET GOLD MINE)



LEGEND

- | | |
|--|------------------------------------|
| ⊗ XRF SAMPLE | == IMPROVED ROAD |
| ⊗ ^W WATER SAMPLE GROUND AND SURFACE | == UNIMPROVED ROAD |
| ⊕ SOIL SAMPLE | ▨ STRUCTURE |
| ● WATER WELL | ☪ PONDED WATER |
| ∧ GATE | ▲ SLOPE DIRECTION |
| → DRAINAGE | ☪ WASTE ROCK DUMP OR TAILINGS PILE |
| → DRY DRAINAGE | |
| *-*-* FENCE | |

DRAWN FOR:

PIONEER
TECHNICAL SERVICES, INC.

TITLE:

CHICAGO MINING-PONY MILL
PA# 29-500

DRAWING NO.: FT340255

DATE: 12/5/84

REV: -

PLOT SCALE: 1 = 100

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): Tailings were not sampled from the tailings pond.

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): The tailings impoundment dike is a centerline constructed facility with a maximum height of 70 feet and does contain an underdrain, and leak detection system.

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): Wet - pond filled with water.

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): The tailings pond was full of water with tailings likely at the base of the pond.

Comments on potential for mitigation: Repair liner leak and neutralize cyanide in the pond; provide alternative water supply to impacted residents.

SAMPLERS:

[illegible]

p-Direct reading (Kelway Meter) ; S-Saturated Paste (Orion Meter)

Comments or deviations from SOPs:

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes___, No X, Number:___ Identification:___

Filled shafts: Yes___, No X, Number:___ Identification:___

Seeps/Springs: Yes X, No___, Number: 1 Identification: South of pond in dry drainage

Groundwater wells within 4 miles?: Yes X, No___;
Number of well logs: 90

Distance to nearest well used for drinking:
___<1,000 ft; X 1,000 ft to 0.5 miles; ___>0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite X, Probable___, Possible___, Unlikely___.

Cyanide detected in downgradient spring and in residential well.

Approximate Depth to Groundwater: ___<25 ft; X 25 - 100 ft; ___>100 ft.

Other observations/notes: There is a mill production well (F-1), a monitoring well, below the tailings impoundment F-3 (SWL = 50') and a Chicago Mining Corp. domestic well in Pony. There are two additional monitoring wells, 1 east of the pond and south of the mill (F-2), and 1 west of the pond (F-4). There is also a downgradient, undeveloped spring that Chicago Mining Corp. uses for monitoring.

SAMPLERS:

[illegible]

NOTE: Estimated 20 (N) percents to (N) from and, shaft, see or spring

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes X, No , Name(s): Pony Creek to the north, and North Willow Creek to the southeast drainage

Dry streambeds: Yes X, No , Name(s): Unnamed tributary running southeast from the pond to North Willow Creek

Other surface water: Yes X, No , Name(s)/Description: Water
impounded in the tailings pond.

Waste materials within any floodplain: Yes____, No X Source ID(s) :__

Approximate Flood frequency? 1 yr, 10 yr, 100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? N/A

High Flow: _____, Average Flow: _____

Distance between waste source(s) and nearest surface water body (ft)?
Over 100 feet

Surface water draining onto or through waste sources: Yes____, No X,
Describe:_____

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
North Willow Creek is used for irrigation, agriculture, wetlands, fishery.

Observed erosional/sedimentation/stream turbidity problems? Yes____, No X. Distance downstream (ft)? 0-500____; 500-1,000____; >1,000____. Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present):

SAMPLERS:

[illegible]

FLOW: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO₃)
Presence of evaporative salt deposits? (ESD)
Discolored or turbid seepage? (SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?
Presence of ferric hydroxide precipitates? (FEOX)
Presence of burned or stressed vegetation? (VEG)
pH \leq 5.0 (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? Approximately 15 acres

Wetlands present: Yes___, No X, Describe: Some in North Willow Creek,
1/4 mile from site

Carbonate rocks/soils: Yes___, No X, Describe: _____

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10___; 10-30___; 30-100 X;
100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or
greater___; Comments _____

Nearest residence: ___<1,000 ft; X 1,000 ft - 0.5 miles; ___>0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS:

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (CLASS)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH/MODERATE/LOW/NONE)
TP-1	Unknown	Wet	Approx. 100,000	0	Yes	None

Notes and Clarifications: Tailings covered with water.

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X
Describe:_____

Population within 1 mile: 1-10____; 10-30____; 30-100 X; 100-300____;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____;
Comments Town of Pony

Evidence of recreational use on site: Yes____, No X, Describe:_____

Accessibility (check each that apply): Easily accessible - no fences, gates, or warning signs; X Moderately Accessible - barbed wire fences, road gated, or signs posted; Difficult Access - chain-link fence, road gated and locked, site guarded (does not include locked or manned access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment The town of Pony is a state historical area.

Wilderness Area - Yes____, No X, Comment_____

T&E Species Habitat - Yes____, No X, Comment_____

Bat Habitat - Yes____, No X, Comment_____

Primary Drainage X; Secondary Drainage X; No Information____:

Riparian Habitat Quality - High____, Medium____, Low Not Rated

Wetlands Frontage - High____, Medium____, Low Not Rated

Fisheries Habitat and Species Classification - 3

Sport Fishery Classification - 4

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes____, No X, Number____, types and locations:_____

Hazardous structures: Yes____, No X, Number____, types and locations:_____

Unstable highwalls, pits, trenches, slopes: Yes____, No X, Number____, types and locations:_____

Unstable waste piles, impoundments, undercut banks: Yes____, No X, Number____, types and locations:_____

Fire and/or Explosion hazards: Yes____, No X, Explain:_____

Bibliography

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0, Prepared by Montana Natural Resource Information System, December 1989.

MDHES/WQB, Environmental Assessment and Addendum Environmental Assessment, Chicago Mining Corporation, August 1989 and December 1989.

MDHES/WQB, Montana Groundwater Pollution Control System Field Inspection Report, Chicago Mining Corporation, June 26, 1990.

MDHES/WQB, Water Quality Monitoring Report and Energy Laboratories Water Analyses, Chicago Mining Corporation, July 24, 1994.

Montana Standard, "Tailings Pond Leaking Cyanide into Water", December 8, 1994.

USGS, Topographic Map, Pony, Montana, 7 1/2 minute Quadrangle, 1988.

SUMMARY OF HISTORICAL ANALYTICAL DATA
FROM OTHER SOURCES

CMC

CHICAGO MINING CORPORATION

File 11-1011
3-10-90
T.W.

July 24, 1994

Mr. Terry Webster
Environmental Specialist IV
Permit/Groundwater Section
Water Quality Bureau
Health and Environmental Sciences
State of Montana
Cogswell Building Room A206
1400 Broadway
Helena MT 59620-0291

Terry:

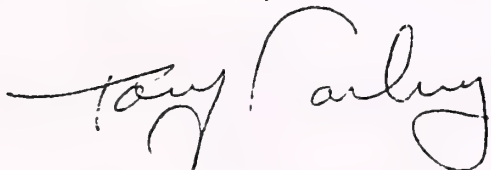
Please find enclosed Water Quality Monitoring Report and Energy Laboratories water analyses for Chicago Mining Corporation's Pony Custom Gold Mill located in the SE4 of S13, T2S, R3W, town of Pony, county of Madison, state of Montana.

Chicago Mining Corporation's Pony Custom Gold Mill facility at the above location has not been operational since November 1991.

I would like to make the Bureau aware that on June 26, 1994, we went to the mill site to take second quarter 1994 water samples. We connected the generator to the main electrical line to which the monitor wells are connected. At that time, the south and west monitor wells would not function. Upon closer inspection, it became evident that someone had cut approximately 1,000 feet of the #10, 3 conductor pump wire and removed it from the premises. Since it was a Sunday, we were unable to take our water samples.

Furthermore, while in the vicinity of the south monitor well, we noticed a damaged 55 gallon barrel lying at the toe of the tailings dam. Apparently, someone removed this barrel from the drum storage area and using a hand-truck, which was taken out of the mill building, transported the barrel to the south edge of the dam and rolled it through the fence and down into the drainage at the toe of the dam. The barrel contained waste oil and was sealed. Evidently, they were not satisfied that the drum didn't rupture so they removed one of the bungs allowing some of the oil to escape onto the ground. We resealed the barrel and removed the soil that appeared to be contaminated. This incident was reported to the local law enforcement authorities.

Thank You,



Tony Carberry

RECEIVED

JUL 25 1994

MONT. DEPT. OF HEALTH & ENV. SCIENCES
WATER QUALITY BUREAU

85 West Algonquin Road Suite 100 Arlington Heights, Illinois 60005

708-956-0007 Fax 708-956-0053

QUARTERLY MONITOR REPORT

PONY CUSTOM GOLD MILL

QUARTER 2ND - 1994

SITE	PUMP ON	PUMP OFF	DATE	TIME	LEVEL	SAMPLER
<i>Above town</i> A Up Willow	TAKEN 1030	—	7-10-94	1030	—	TC
<i>influence with Pony</i> B Down Willow	TAKEN 1050	—		1050	—	TC
✓ C Pony Well	1120	1127		1120	—	TC
<i>- Gate to mine</i> D Up Pony	TAKEN 1200	—		1200	—	TC
<i>influence with Willow</i> E Down Pony	TAKEN 1140	—		1140	—	TC
✓ F1 Production Well	1230	1242		1230	—	TC
✓ F2 S. Monitor Well	1300	1309		1300	5669.10	TC
✓ F3 E. Monitor Well	1330	1338		1330	5790.60	TC
✓ F4 W. Monitor Well	1400	1410		1400	—	TC
✓ Undeveloped Spring	TAKEN 1430	—		1430	—	TC
Underdrain	N.A.			1435	NONE DETECTED	TC
Impoundment Leak Detection - East	1415-1425 + 1445	1425 + 1450		1425	NONE DETECTED	TC
Impoundment Leak Detection - West	1415 + 1445	1425 + 1450	✓	1425	NONE DETECTED	TC

Remarks:

UNDERDRAIN WAS DRY!

RECEIVED

JUL 25 1994

MONT. DEPT. OF HEALTH & ENV. SCIENCES
WATER QUALITY BUREAU

**ENERGY LABORATORIES, INC.**P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489**LABORATORY REPORT**

TO: Tony Carberry
ADDRESS: Sana Minerals
P.O. Box 628
Pony, MT 59747

LAB NO.: 94-30880
DATE: 07/20/94 jmw

WATER ANALYSIS

F1 Production Well
Sampled 07/10/94 @ 1230
Submitted 07/11/94

RECEIVED**JUL 25 1994****MONT. DEPT. OF HEALTH & ENV. SCIENCES
WATER QUALITY BUREAU**

<u>Constituent</u>	<u>mg/l (ppm)</u>	<u>Date Analyzed</u>
Sodium	10	07/13/94
Chloride	10	07/15/94
Total Dissolved Solids @ 180°C	207	07/13/94
Specific Conductance @ 25°C	315 μ mhos/cm	07/14/94
pH	7.1 s.u.	07/13/94
Nitrate plus Nitrite as N	3.44	07/14/94
Total Cyanide	<0.005	07/12/94
<u>Dissolved Metals</u>		
Arsenic	<0.005	07/14/94
Cadmium	<0.001	07/12/94
Copper	<0.01	07/12/94
Iron	0.35	07/12/94
Lead	<0.01	07/12/94
Mercury	<0.001	07/13/94
Zinc	1.56	07/12/94

**ENERGY LABORATORIES, INC.**P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489**LABORATORY REPORT**

TO: Tony Carberry
ADDRESS: Sana Minerals
P.O. Box 628
Pony, MT 59747

LAB NO.: 94-30881
DATE: 07/20/94 jmw

WATER ANALYSIS

F2 S. Mon. Well
Sampled 07/10/94 @ 1300
Submitted 07/11/94

<u>Constituent</u>	<u>mg/l (ppm)</u>	<u>Date Analyzed</u>
Sodium	96	07/13/94
Chloride	27	07/15/94
Total Dissolved Solids @ 180°C	348	07/13/94
Specific Conductance @ 25°C	585 μ mhos/cm	07/14/94
pH	8.1 s.u.	07/13/94
Nitrate plus Nitrite as N	<0.05	07/14/94
Total Cyanide	<0.005	07/12/94
<u>Dissolved Metals</u>		
Arsenic	<0.005	07/14/94
Cadmium	<0.001	07/12/94
Copper	<0.01	07/12/94
Iron	4.35	07/12/94
Lead	<0.01	07/12/94
Mercury	<0.001	07/13/94
Zinc	1.06	07/12/94

**ENERGY LABORATORIES, INC.**P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489**LABORATORY REPORT**

TO: Tony Carberry
ADDRESS: Sana Minerals
P.O. Box 628
Pony, MT 59747

LAB NO.: 94-30882
DATE: 07/20/94 jmw

WATER ANALYSIS

F3 E. Mon. Well
Sampled 07/10/94 @ 1330
Submitted 07/11/94

<u>Constituent</u>	<u>mg/l (ppm)</u>	<u>Date Analyzed</u>
Sodium	7	07/13/94
Chloride	3	07/15/94
Total Dissolved Solids @ 180°C	182	07/13/94
Specific Conductance @ 25°C	281 μ mhos/cm	07/14/94
pH	7.4 s.u.	07/13/94
Nitrate plus Nitrite as N	0.09	07/14/94
Total Cyanide	<0.005	07/12/94
<u>Dissolved Metals</u>		
Arsenic	<0.005	07/14/94
Cadmium	<0.001	07/12/94
Copper	0.01	07/12/94
Iron	0.80	07/12/94
Lead	<0.01	07/12/94
Mercury	<0.001	07/13/94
Zinc	2.78	07/12/94

**ENERGY LABORATORIES, INC.**P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489**LABORATORY REPORT****TO:** Tony Carberry
ADDRESS: Sana Minerals
P.O. Box 628
Pony, MT 59747**LAB NO.:** 94-30883
DATE: 07/20/94 jmw**WATER ANALYSIS**F4 W. Mon. Well
Sampled 07/10/94 @ 1400
Submitted 07/11/94

<u>Constituent</u>	<u>mg/l (ppm)</u>	<u>Date Analyzed</u>
Sodium	8	07/13/94
Chloride	1	07/15/94
Total Dissolved Solids @ 180°C	181	07/13/94
Specific Conductance @ 25°C	321 μ mhos/cm	07/14/94
pH	7.7 s.u.	07/13/94
Nitrate plus Nitrite as N	0.14	07/14/94
Total Cyanide	<0.005	07/12/94
<u>Dissolved Metals</u>		
Arsenic	<0.005	07/14/94
Cadmium	<0.001	07/12/94
Copper	<0.01	07/12/94
Iron	0.50	07/12/94
Lead	<0.01	07/12/94
Mercury	<0.001	07/13/94
Zinc	0.15	07/12/94

**ENERGY LABORATORIES, INC.**P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489**LABORATORY REPORT****TO:** Tony Carberry
ADDRESS: Sana Minerals
P.O. Box 628
Pony, MT 59747**LAB NO.:** 94-30887
DATE: 07/20/94 jmw**WATER ANALYSIS**C Pony Well
Sampled 07/10/94 @ 1120
Submitted 07/11/94*Next to Bar
Gene Nelson House*

<u>Constituent</u>	<u>mg/l (ppm)</u>	<u>Date Analyzed</u>
Sodium	7	07/13/94
Chloride	2	07/15/94
Total Dissolved Solids @ 180°C	148	07/13/94
Specific Conductance @ 25°C	235 μ mhos/cm	07/14/94
pH	6.8 s.u.	07/13/94
Nitrate plus Nitrite as N	1.84	07/14/94
Total Cyanide	<0.005	07/12/94
<u>Total Recoverable Metals</u>		
Arsenic	<0.005	07/14/94
Cadmium	<0.001	07/14/94
Copper	<0.01	07/14/94
Iron	<0.03	07/14/94
Lead	<0.01	07/15/94
Mercury	<0.001	07/13/94
Zinc	0.02	07/14/94

**ENERGY LABORATORIES, INC.**P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489**LABORATORY REPORT****TO:** Tony Carberry
ADDRESS: Sana Minerals
P.O. Box 628
Pony, MT 59747**LAB NO.:** 94-30884
DATE: 07/20/94 jmw**WATER ANALYSIS**Undeveloped Spring
Sampled 07/10/94 @ 1430
Submitted 07/11/94

<u>Constituent</u>	<u>mg/l (ppm)</u>	<u>Date Analyzed</u>
Sodium	8	07/13/94
Chloride	7	07/15/94
Total Dissolved Solids @ 180°C	199	07/13/94
Specific Conductance @ 25°C	318 μ mhos/cm	07/14/94
pH	7.6 s.u.	07/13/94
Nitrate plus Nitrite as N	2.83	07/14/94
Total Cyanide	<0.005	07/12/94
<u>Dissolved Metals</u>		
Arsenic	<0.005	07/14/94
Cadmium	<0.001	07/12/94
Copper	<0.01	07/12/94
Iron	0.06	07/12/94
Lead	<0.01	07/12/94
Mercury	<0.001	07/13/94
Zinc	<0.01	07/12/94

**ENERGY LABORATORIES, INC.**P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489**LABORATORY REPORT****TO:** Tony Carberry
ADDRESS: Sana Minerals
P.O. Box 628
Pony, MT 59747**LAB NO.:** 94-30885
DATE: 07/20/94 jmw**WATER ANALYSIS**A Surface, Up Willow Creek
Sampled 07/10/94 @ 1030
Submitted 07/11/94

<u>Constituent</u>	<u>mg/l (ppm)</u>	<u>Date Analyzed</u>
Sodium	3	07/13/94
Chloride	<1	07/15/94
Total Dissolved Solids @ 180°C	67	07/13/94
Specific Conductance @ 25°C	69 μ mhos/cm	07/14/94
pH	7.5 s.u.	07/13/94
Nitrate plus Nitrite as N	<0.05	07/14/94
Total Cyanide	<0.005	07/12/94
<u>Total Recoverable Metals</u>		
Arsenic	<0.005	07/14/94
Cadmium	<0.001	07/14/94
Copper	<0.01	07/14/94
Iron	0.08	07/14/94
Lead	0.01	07/14/94
Mercury	<0.001	07/13/94
Zinc	<0.01	07/14/94

**ENERGY LABORATORIES, INC.**P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489**LABORATORY REPORT****TO:** Tony Carberry
ADDRESS: Sana Minerals
P.O. Box 628
Pony, MT 59747**LAB NO.:** 94-30886
DATE: 07/20/94 jmw**WATER ANALYSIS**B Surface, Down Willow Creek
Sampled 07/10/94 @ 1050
Submitted 07/11/94

<u>Constituent</u>	<u>mg/l (ppm)</u>	<u>Date Analyzed</u>
Sodium	3	07/13/94
Chloride	<1	07/15/94
Total Dissolved Solids @ 180°C	51	07/13/94
Specific Conductance @ 25°C	69 μmhos/cm	07/14/94
pH	7.7 s.u.	07/13/94
Nitrate plus Nitrite as N	<0.05	07/14/94
Total Cyanide	<0.005	07/12/94
<u>Total Recoverable Metals</u>		
Arsenic	<0.005	07/14/94
Cadmium	<0.001	07/14/94
Copper	<0.01	07/14/94
Iron	0.08	07/14/94
Lead	<0.01	07/15/94
Mercury	<0.001	07/13/94
Zinc	<0.01	07/14/94

**ENERGY LABORATORIES, INC.**P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489**LABORATORY REPORT****TO:** Tony Carberry
ADDRESS: Sana Minerals
P.O. Box 628
Pony, MT 59747**LAB NO.:** 94-30888
DATE: 07/20/94 jmw**WATER ANALYSIS**D Surface, Up Pony Creek
Sampled 07/10/94 @ 1200
Submitted 07/11/94

<u>Constituent</u>	<u>mg/l (ppm)</u>	<u>Date Analyzed</u>
Sodium	6	07/13/94
Chloride	<1	07/15/94
Total Dissolved Solids @ 180°C	112	07/13/94
Specific Conductance @ 25°C	186 μ mhos/cm	07/14/94
pH	7.9 s.u.	07/13/94
Nitrate plus Nitrite as N	0.24	07/14/94
Total Cyanide	<0.005	07/12/94
<u>Total Recoverable Metals</u>		
Arsenic	<0.005	07/14/94
Cadmium	<0.001	07/14/94
Copper	<0.01	07/14/94
Iron	0.15	07/14/94
Lead	<0.01	07/14/94
Mercury	<0.001	07/13/94
Zinc	0.02	07/14/94

Lab Nos. 94-30880-9

QUALITY ASSURANCE DATA PACKAGE

This report includes the results of quality assurance tests performed with the sample analyses. They are performed to determine if the methodology is in control and to monitor the laboratory's ability to produce accurate and precise results.

<u>Constituent</u>	<u>Duplicate Analysis</u> -----mg/l (ppm)-----		<u>Spiked</u> <u>Analysis,</u> <u>%</u>	<u>Blank</u> <u>Analysis,</u> <u>mg/l (ppm)</u>	<u>-----Reference-----</u> <u>Sample</u> <u>Analysis,</u> <u>mg/l (ppm)</u>	<u>Acceptance</u> <u>Range,</u> <u>mg/l (ppm)</u>	<u>Date</u> <u>Analyzed</u>
	<u>Original</u>	<u>Duplicate</u>	<u>Recovery</u>				
Sodium	3	3	113	<1	52	40-60	07/13/94
Chloride	65	64	100	<1	76	69-85	07/15/94
Total Dissolved Solids @ 180°C	51	51	102	<1	N/A	N/A	07/13/94
Specific Conductance @ 25°C, µmhos/cm	613	614	N/A	1	N/A	N/A	07/14/94
pH, s.u.	7.5	7.6	N/A	N/A	N/A	N/A	07/13/94
Nitrate plus Nitrite as N	0.24	0.26	103	<0.05	3.45	3.20-4.00	07/14/94
Total Cyanide	<0.005	<0.005	98	<0.005	0.198	0.155-0.271	07/12/94
<u>Metals</u>							
Arsenic, Dissolved	<0.005	<0.005	106	<0.005	0.029	0.024-0.039	07/17/94
Arsenic, Total Recoverable	<0.005	<0.005	106	<0.005	0.029	0.024-0.039	07/14/94
Cadmium, Dissolved	<0.001	<0.001	112	<0.001	1.01	0.85-1.15	07/12/94
Cadmium, Total Recoverable	<0.001	<0.001	85	<0.001	1.03	0.85-1.15	07/14/94
Copper, Dissolved	<0.01	<0.01	119	<0.01	1.03	0.85-1.15	07/12/94
Copper, Total Recoverable	4.43	4.42	92	<0.01	1.05	0.85-1.15	07/14/94
Iron, Dissolved	0.35	0.35	102	<0.03	1.07	0.85-1.15	07/12/94
Iron, Total Recoverable	18.2	18.4	109	<0.03	1.07	0.85-1.15	07/14/94
Lead, Dissolved	<0.01	<0.01	115	<0.01	1.03	0.85-1.15	07/12/94
Lead, Total Recoverable	<0.01	<0.01	89	<0.01	1.07	0.85-1.15	07/14/94
Mercury, Dissolved	<0.001	<0.001	104	<0.001	0.005	0.0045-0.0062	07/13/94
Mercury, Total Recoverable	<0.001	<0.001	104	<0.001	0.005	0.0045-0.0062	07/13/94
Zinc, Dissolved	1.56	1.56	114	<0.01	1.11	0.85-1.15	07/12/94
Zinc, Total Recoverable	0.55	0.54	100	<0.01	1.09	0.85-1.15	07/14/94



29-500, #6: Panorama facing west toward Pony Mill from
above (1 of 3)



29-500, #7: Panorama facing west toward Pony Mill from
above (2 of 3)



29-500, #8: Panorama facing west toward Pony Mill from
above (3 of 3)

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: U.S. GRANT MINE/MILLSITE PA#: 29-095

Date: July 18, 1994 Time: 1015-1930

Field Team Leader: Flammang, Pioneer

Sampling Personnel: Clark, West; Pioneer

Visitors: Resident/Caretaker

Weather/Seasonality Observations: Overcast; hot (70°-90°F); breezy (5-15 mph); very dry.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #18: WR-1 (left) and WR-2 (right) facing west; #19: WR-3 facing west; #20: Adit #4 (open) with discharge, AD-1 sample location; #21: WR-4B (foreground) and WR-4A (background) facing south; #22: Facing east from WR-4B toward TP-1 (1 of 3); #23: Facing east from WR-4B toward south half of TP-1 and north half of TP-2 (2 of 3); #24: Facing east from WR-4B toward south half of TP-2 (3 of 3); #25: Monitoring well (GW-1 and GW-2 sample locations) and TP-1 dam in background; #26: Mill building (foreground) and WR-4B (right in background).
Video Tape No. 2

General Comments/Observations (not covered specifically in attached Inventory Forms): In the middle portion of the mine site, identified as the "Bone Yard" by Northern in the previous inventory, are many pieces of equipment, some of which could be hazardous to casual site visitors. One piece of equipment looks fairly new. Mill building is in good shape, and equipment is present. It appears milling could be restarted with minimal effort. Caretaker lives on-site in a trailer, but did not stop us as we went up to mine area.

Other Hazardous Materials/Substances Present: Eight 55 gal. barrels (plastic) in bone yard containing unknown; all feel full, one labeled, "HAZ". Sealed plastic barrel inside ore cart seems to be 1/4 full of unknown fluid. Four old transformers by plastic barrels, ground below shows signs of spill; all are rusted. Two 1,000 gal. fuel tanks; one has gauge that reads 80% full, the other could be empty and may contain sludge. One open bag of unknown white powder and a 30 gal. drum rusted on the side containing white powder. Three 55 gal. drums rusted open by roller on mill level; 1/2 full of unknown pinkish powder, possibly tailings.

General Comments on Potential Remedial Alternatives: Push TP-2 back into contained area. Cover or amend and revegetate both TP-1 and TP-2 to eliminate blowing dust. Determine contents of barrels on-site and dispose of properly. Close open adits.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): U.S. GRANT MINE/MILLSITE PA#: 29-095

Legal Description: T 6S ; R 3W ; Sec. 26 , NW 1/4 SW 1/4 1/4

County: MADISON Mining District: VIRGINIA CITY

Latitude: N 46° 24' 58.8" Longitude: W 112° 18' 40.6"

Primary Drainage Basin and Code: Granite Creek/10020003

Secondary Drainage Basin: Alder Gulch

USGS Quadrangle map name(s): Virginia City

Mine Type/Commodities: Hardrock, Millsite/Gold, Silver

Activity Status: Active , Inactive/Exploration X , Abandoned .

Ownership: Known Y X N ; private/public? Private

Owner, Agent, or Contact (Include address and phone when available): Madison Mining Company is operator.

Relationship to other mines/sites in the area/district: It appears that Cornucopia and El Fleeda mines could be on the same vein.

Regulatory Status (Activity by other agencies)? Hardrock permits?
Past Reclamation Activities? Operating permit to run floatation mill and tailings impoundment by WOB from 1987-1992. Madison Mining Co. is in the process of reapplying for permit.

General site features: Elevation 5800'-6300', Slope 20° (mine); 5° (tails), Aspect West (mine); Northwest (tails)

Land use: Mining X , Recreational X , Residential X , Urban , Agricultural , Other(Specify)

Area of disturbed/unvegetated lands? 35 acre(s) .

Site Dimensions: 1,900 feet x 800 feet

Predominant vegetation types: Knapweed, sage brush, bunch grass (upper); Knapweed, aspen, cottonwood, willow, alder (lower).

Access: roads - good (paved) , poor (maintained dirt road) X , 4wd X , trail .

Other logistical considerations (proximity to other sites). On same road, but before Belle mine. Upper roads are over grown and rocky (4wd), high clearance. Lower (mill area) on good road.

Well logs within 1 mile radius; (Attach MBMG Well Log Printout(s): There are 7 wells reported within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). Site is underlain by gneiss. Site lies above and on west side of Alder Gulch, which flows north away from the site. Alder Gulch meets Granite Creek approximately 4 miles northwest. It continues to flow 5 miles west to the Ruby River.

Mining/milling history, ore type/tenor, host rock, gangue: Site was claimed in 1885 and patented in 1887. Production from 1908 to 1926 inclusive, was 834 oz. gold, and 46,393 oz. silver from 1,764 tons of ore. Mine development continued into 1930s. In 1937, old dumps were reworked. Mine worked intermittently through at least 1987. Vein mineralization containing pyrite, chalcopyrite, and galena in gangue of quartz. Vigilante Resources granted permit in 1987 to operate mill with ore from a mine in the Tobacco Roots. Mill had been in operation prior to permit and only ran a short time in 1988; permit expired in 1992.

Mine Operation?

Shafts - Yes , No X, # , Comment

Adits - Yes X, No , # 9, Comment 5 open; 2 collapsed; 1 open 25'; 1 open and discharging

Pits - Yes X, No , # 1, Comment North of Adit #3

Placers - Yes , No X, # , Comment

Other - Yes , No X, # , Comment

Mill Operation? Yes X, No . If yes answer the next three questions:

Period(s) of Operation: Mill built in 1903; idle from 1907 to 1914; mill no longer mentioned in literature by 1937; newer building on-site operated intermittently prior to 1979 through 1988.

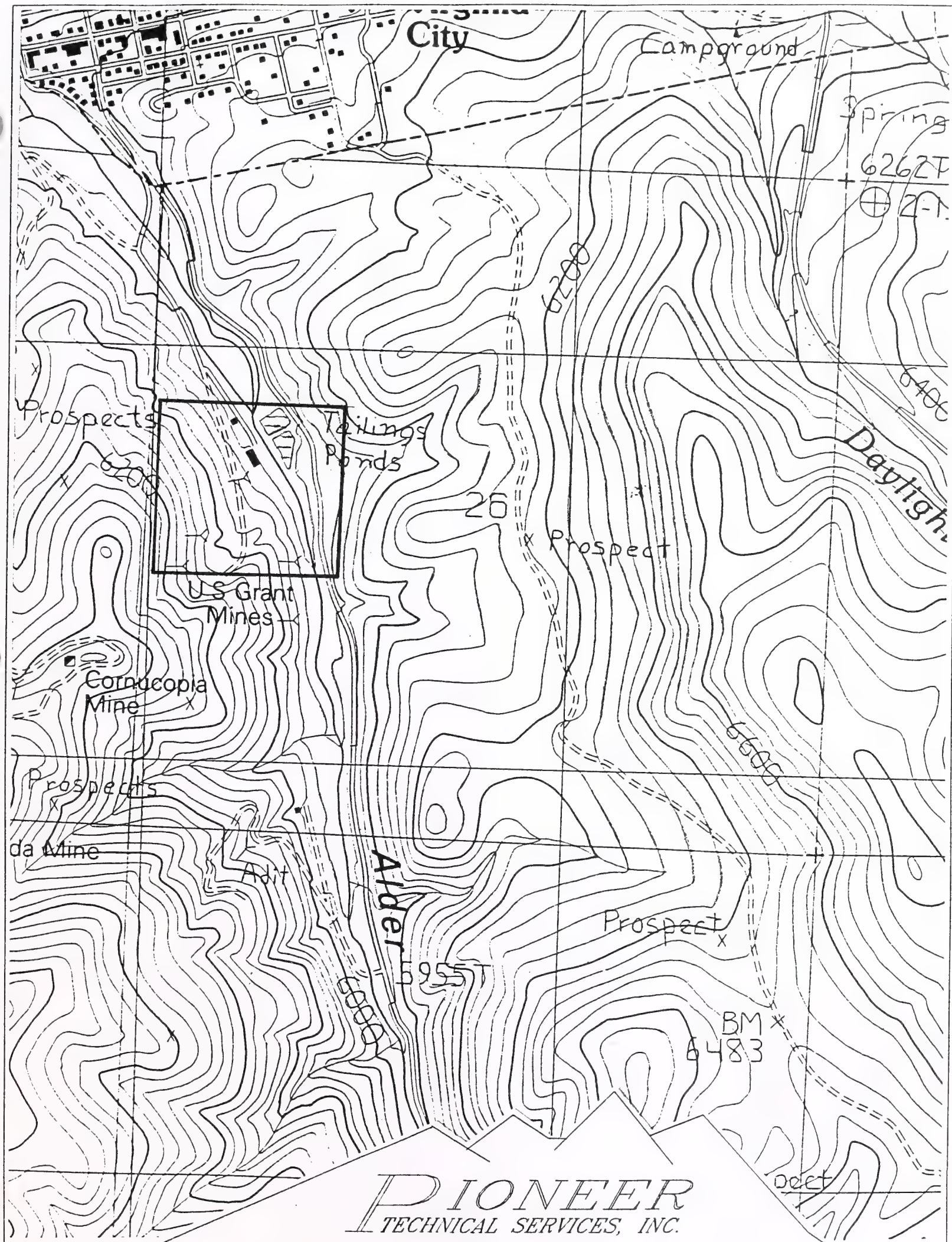
Origin of Ore Milled - Custom Mill X Dedicated Mill ; **Number and names of mines that supplied mill feed:** U.S. Grant; unknown mine in the Tobacco Roots

Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting? 15-stamp mill with plate amalgamation, concentrating tables and cyanide tanks. 1979 mill was reported as a frothing floatation process though it had equipment for cyanide process.

Montana Bureau of Mines and Geology
Water Well Log Data

08/12/1994

Well No.	Location	Depth	Yield	Static Water Level
M:108803	06S 03W 22 AB	294.0	7.5	18.00
M:108804	06S 03W 22 ACDB	170.0	0.0	29.00
M:108805	06S 03W 23 C	91.0	3.0	55.00
M:108806	06S 03W 23 DBB	20.0	10.0	2.00
M:108808	06S 03W 27	0.0	0.0	0.00
M:108807	06S 03W 27	0.0	0.0	0.00
M:138743	06S 03W 27 BC	195.0	25.0	80.00



U.S. GRANT, P.A. NO. 29-095
T06S, R03W, SECTION 35
SCALE: 1" = 1000'

FAIRWEATHER
MEMORIAL

TO VIRGINIA CITY

GATE

SW-2
SE-2

TANK
20" DIAMETER

ROAD

ROAD

100 GAL.
GAS TANK

TRAILERS

OFFICE

GW-3

DOZER

SHED

MONITOR WELL
GW-1
GW-2

RESIDENTIAL
WELL

TP1
AREA= 4020 SQ.M.
43280 SQ.FT.
4810 SQ.YDS.
VOLUME= 4810 CU.YDS.

MILL
BUILD.

RR
CARS

ORE

WR4
AREA= 925 SQ.M.
9950 SQ.FT.
1110 SQ.YDS.
VOLUME= 1110 CU.YDS.

TANK
10" DIAMETER

LOADOUT

AD1

SHED

ADIT DISCHARGE

TP2
AREA= 8090 SQ.M.
87050 SQ.FT.
9670 SQ.YDS.
VOLUME= 16120 CU.YDS.

PIT
AREA= 180 SQ.M.
1940 SQ.FT.
215 SQ.YDS.
VOLUME= 570 CU.YDS.

WR3
AREA= 930 SQ.M.
10010 SQ.FT.
1110 SQ.YDS.
VOLUME= 745 CU.YDS.

WR2
AREA= 165 SQ.M.
1775 SQ.FT.
200 SQ.YDS.
VOLUME= 135 CU.YDS.

LARGE TANK WITH TAILINGS

"BONE YARD", ASSORTED MACHINERY

EIGHT FULL BARRELS
NO LABELS

ROAD

DRY DRAINAGE

WR1
AREA= 1580 SQ.M.
17000 SQ.FT.
1890 SQ.YDS.
VOLUME= 1260 CU.YDS.

TANK

LOADOUT

WR
AREA= 30 SQ.M.
320 SQ.FT.
35 SQ.YDS.
VOLUME= 10 CU.YDS.

ROAD

ROAD

PITS

WR
AREA= 60 SQ.M.
610 SQ.FT.
70 SQ.YDS.
VOLUME= 45 CU.YDS.

LEGEND

- | | | | |
|---------|------------------------------------|-----------|-------------------------------------|
| ⊗ | XRF SAMPLE | ===== | IMPROVED ROAD |
| ⊗ W | WATER SAMPLE
GROUND AND SURFACE | - - - - - | UNIMPROVED ROAD |
| ● | WATER WELL | ▨ | STRUCTURE |
| — | OPEN ADIT | ⬮ | EXCAVATION |
| —X— | COLLAPSED ADIT | ⬮ | SLOPE DIRECTION |
| — | GATE | ⬮ | WASTE ROCK DUMP
OR TAILINGS PILE |
| → | DRAINAGE | | |
| → | DRY DRAINAGE | | |
| —X—X—X— | FENCE | | |

DRAWN FOR:

PIONEER
TECHNICAL SERVICES, INC.

TITLE:

U.S. GRANT
PA# 29-095

DRAWING NO.: PT340225
DATE: 11/23/94

REV: -
PLOT SCALE: 1 = 50

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): TP-1 is 95% sand and 5% clay in occasional layers. TP-2 is 100% sand.

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): TP-1 - 0 to 18", light to medium brown sand; 18-30", black sand (XRF indicated very high zinc and lead concentrations; 30"-11.5', medium brown to medium brown/red sand. TP-2 has been pushed around by bulldozer; north end appears to be 25 feet deep; in the middle appears to be only surface tailings; south end may be 10 feet deep.

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): Dry

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): Both dams appear to be in good shape. TP-2 tailings have been pushed up on the north and east side, so it is possible to erode out of dam area.

Comments on potential for mitigation: Grade TP-2, cover or amend, and revegetate. TP-1 is fairly smooth; topsoil and revegetate. If downgradient monitoring well shows problem - reevaluate.

SOURCE INVENTORY FORM

SAMPLERS: Flammang, Clark, West

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd ³)	LOCATION/DESCRIPTION	CONTAINMENT	pH SU (D/S)*	RADIO-ACTIVITY (MR/HR)	LAB. SAMPLE NO.	DATE/TIME	ANALYSES
TP-1A-1	TAIL	4,810	Northeast corner of TP-1, borehole; 0-18", light to medium brown sand	Dam	6.6 (D)	0.04	29-095-TP-1	07/18/94 1830	T-Metals, ABA, Cyanide
TP-1A-2	TAIL		18-30", black sand	Dam	5.8 (D)	0.03			
TP-1A-3	TAIL		30"-7', brown sand	Dam	6.0 (D)	0.03			
TP-1A-4	TAIL		7-11.5', brown sand	Dam	5.8 (D)	0.04			
TP-2A	TAIL	16,120	South side of TP-2, near center, profile; 0-25', light brown sand	Dam	5.9 (D)	0.04	29-095-TP-2	07/18/94 1845	T-Metals, ABA, Cyanide
TP-2B-1	TAIL		North end of TP-2, south face, profile; 0-15', light brown sand	Dam	5.6 (D)	0.04			
TP-2B-2	TAIL		15-20', dark brown sand	Dam	6.2 (D)	0.04			
WR-1	WR	1,260	Associated with Adit #1, east of loadout; just off road on bottom of WR-1	None	5.9 (D)	0.05	29-095-WR-1	07/18/94 1745	T-Metals, ABA
WR-2	WR	135	Northern most collapsed adit, south of Adit #2; approx. 10' above base and road	None	5.8 (D)	0.03			
WR-3	WR	745	Associated with Adit #2 and #3; east face, south end of lower WR-3	None	6.4 (D)	0.04			
WR-4A	WR	1,110	Associated with lowest Adit #4, east of adit; south end of dump on east face, north of loadout	None	6.6 (D)	0.04	29-095-WR-2	07/18/94 1800	T-Metals, ABA
WR-4B	WR		North end of east face, North of ore bin	None	6.6 (D)	0.045			
ORE	WR		On top of wooden loading ramp	None	6.0 (D)	0.05	N/A	N/A	XRF Analysis

*Direct reading (Kilowatt Meter); S-saturated Paste (Orion Meter)

Comments or deviations from SOPs: 29-095-TP-1 is composite of TP-1A-1 through -1A-4. 29-095-TP-2 is composite of TP-2A, -2B-1, and -2B-2. 29-095-WR-1 is composite of WR-1 through -3. 29-095-WR-2 is composite of WR-4A and -4B. See Belle (29-098-SS-1) for background sample.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes X, No , Number: 1 Identification: Adit #4
(lowest adit)

Filled shafts: Yes , No X, Number: Identification:

Seeps/Springs: Yes , No X, Number: Identification:

Groundwater wells within 4 miles?: Yes X, No ;

Number of well logs: 29

Distance to nearest well used for drinking:

X <1,000 ft; 1,000 ft to 0.5 miles; >0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite , Probable , Possible X, Unlikely .

Large, uncontained source (tailings) with elevated lead and zinc
concentrations sitting in area where groundwater is only 5 feet below
ground level.

Approximate Depth to Groundwater: X <25 ft; 25 - 100 ft; >100 ft.

Other observations/notes: One monitoring well present approx. 25' from
base of TP-1, east of Alder Creek. SWL was at 6.23 bgs, TD was 20';
approx. 1.2' of 2" PVC extended above ground (sampled as GW-1 and GW-2).
This well was installed in February of 1993 by O'Keefe Drilling. The
resident's and mine drinking well was set about 1/2 way down the
northwest corner of the dam. This was the original monitoring well for
the tailings pond and was converted to a drinking water well sometime
after 1988. Well is 45' deep with SWL at about 22'. Caretaker said
that every 3 months they sample monitoring well, residential well, and
send samples to lab in Billings with a report to Helena (sampled as GW-
3). Recent results included under additional data. Adit #4 discharge
flows out of adit and immediately is routed south off of WR-4A. Ditch
sides are well vegetated and sediment and cobbles in ditch appear to
have been there a long time. Water runs 150' then breaks out of ditch
and drops over old road bed; much erosional cutting going on, then flows
into Alder Creek just across from south end of TP-2.

GROUNDWATER INVENTORY FORM

SAMPLERS: Flammang, West

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SOURCE	FLOW cfs/gpm	pH SU	SC $\mu S/cm$ @ 25°C	Eh mV	Temp °C	ALK. mg/L as CaCO ₃	Depth ft	LAB. SAMPLE NO.	DATE/TIME	ANALYSES
AD-1	AD	Collected at portal of Adit #4	12 gpm (E)	6.35	NM	NM	25.5	96	N/A	29-095-AD-1	07/18/94 1315	T-Metals, TDS, Hardness, Cl, SO ₄ , NO ₂ /NO ₃
GW-1	MW	Monitoring well at center of base of TP-1 dam	N/A	7.61	512	158.7	18.8	138	6.23 SWL	29-095-GW-1	07/18/94 1645	D-Metals, TDS, Hardness, Cl, SO ₄ , NO ₂ /NO ₃ , Cyanide
GW-2	MW	Duplicate of GW-1	N/A	7.61	512	158.7	18.8	138	6.23 SWL	29-095-GW-2	07/18/94 1715	D-Metals, TDS, Hardness, Cl, SO ₄ , NO ₂ /NO ₃ , Cyanide
GW-3	RW	Drinking water well on TP-1 dam; sampled from outside faucet on trailer	N/A	7.60	339	161.5	14.7	153	22 SWL	29-095-GW-3	07/19/94 1500	T-Metals, TDS, Hardness, Cl, SO ₄ , NO ₂ /NO ₃ , Cyanide
GW-4	BLANK	QA/QC sample	N/A	N/A	N/A	N/A	N/A	N/A	N/A	29-095-GW-4	07/18/94 1515	T-Metals, Cyanide

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring

Comments or Deviations from the SOPs (Pioneer SAP, 1993): 6.25 gallons were purged from MW-1 (3x casing volume). Water stayed dirty throughout with sand settling at bottom of bucket and sample bottles. Outside faucet ran 5 minutes before sampling of GW-2.

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes ☒, No ☐, Name(s): Alder Gulch

Dry streambeds: Yes ☐, No ☒, Name(s): Dry drainage showing no signs of carrying water is present through the mine area (upper portion) of the site.

Other surface water: Yes ☐, No ☒, Name(s)/Description: _____

Waste materials within any floodplain: Yes ☒, No ☐ Source ID(s): TP-1 and TP-2 are in floodplain of Alder Gulch.

Approximate Flood frequency? ☐ 1 yr, ☒ 10 yr, ☐ 100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? 0.5 cfs

High Flow: 5 cfs, Average Flow: 0.5 cfs

Distance between waste source(s) and nearest surface water body (ft)? WR-4 and adit discharge approx. 25 feet apart; TP-1 width of dam, approx. 25 feet from Alder Gulch; TP-2 has some tailings eroded towards Alder Gulch, about 35 feet separate them.

Surface water draining onto or through waste sources: Yes ☐, No ☒, Describe: Run-off and precipitation only

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?) Fishery, wetlands, agriculture, irrigation; childrens' fishing pond approximately 1 mile away on north side of Virginia City.

Observed erosional/sedimentation/stream turbidity problems? Yes ☐, No ☒. Distance downstream (ft)? 0-500 ☐; 500-1,000 ☐; >1,000 ☐. Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): Very small settling pond at base of TP-1 appears to have a few tailings. About 750 feet from site, Alder Gulch flows into big pond.

SAMPLERS: Clark

3 (M) perennans 20 (M) perennans: NOT

Creek flows into large pond approximately 300 feet downgradient.

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides?	(SO ₃)
Presence of evaporative salt deposits?	(ESD)
Discolored or turbid seepage?	(SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?	
Presence of ferric hydroxide precipitates?	(FEOX)
Presence of burned or stressed vegetation?	(VEG)
pH \leq 5.0	(pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? 5 to 7 acres at present tailings pond

Wetlands present: Yes ☐, No ☒, Describe: Streamside only on-site; downgradient near Virginia City there are large wetlands.

Carbonate rocks/soils: Yes ☐, No ☒, Describe: _____

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10 ☐; 10-30 ☐; 30-100 ☐; 100-300 ☒; 300-1,000 ☐; 1,000-3,000 ☐; 3,000-10,000 ☐; 10,000 or greater ☐; Comments _____

Nearest residence: ☒ <1,000 ft; ☐ 1,000 ft - 0.5 miles; ☐ >0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Flammang, Clark, West

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH/MODERATE/LOW/NONE)
WR-1	FE0X; SO3	Dry	17,000	16,150	Yes	Low
WR-2	FE0X; SO3	Dry	1,775	1,605	Yes	Low
WR-3	FE0X; SO3	Dry	10,010	9,000	Yes	Low
WR-4	FE0X; SO3	Dry	9,950	9,455	Yes	Low
TP-1	None	Dry	43,260	42,395	Yes	Observed
TP-2	None	Dry	87,050	85,310	Yes	Observed
AD-1	None	N/A	N/A	N/A	N/A	N/A
ORE	None	Dry	Approx. 100	Approx. 100	Yes	Low

Notes and Clarifications: Very small amount of ore in several places associated with loadouts, ore bins, etc. (approx. 10 cubic yards total).

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes X, No _____
Describe: Caretaker lives on-site less than 200' from TP-1 and WR-4.

Population within 1 mile: 1-10____; 10-30____; 30-100____; 100-300 X;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____.

Evidence of recreational use on site: Yes____, No X, Describe:_____

Accessibility (check each that apply): _____ Easily accessible - no fences, gates, or warning signs; X Moderately Accessible - barbed wire fences, road gated, or signs posted; _____ Difficult Access - chain-link fence, road gated and locked, site guarded (does not include locked or manned access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment _____
Wilderness Area - Yes____, No X, Comment _____
T&E Species Habitat - Yes____, No X, Comment _____
Bat Habitat - Yes____, No X, Comment _____

Primary Drainage____; Secondary Drainage X; No Information____:

Riparian Habitat Quality - High____, Medium____, Low Not Rated

Wetlands Frontage - High____, Medium____, Low Not Rated

Fisheries Habitat and Species Classification - 4

Sport Fishery Classification - 4

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes X, No____, Number 5, types and locations:____
Adits #1, #3, and #4; adit 100' south of dry drainage and above small road leading up from Adit #1; 60' below that in dry drainage, collapsed hole into adit.

Hazardous structures: Yes X, No____, Number 1, types and locations:____
Loadout associated with Adit #1

Unstable highwalls, pits, trenches, slopes: Yes X, No____, Number 1, types and locations: 40' highwall associated with pit north of Adit #3 on west side, identified by Northern as a shaft.

Unstable waste piles, impoundments, undercut banks: Yes X, No____, Number 3, types and locations: WR-4A and -4B are at angle of repose, steep, and unvegetated. TP-1 dam face on north side on west end appears to be caving away.

Fire and/or Explosion hazards: Yes X, No____, Explain: Fuel tanks in bone yard; possible unknowns in barrels.

Bibliography

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0, Prepared by Montana Natural Resource Information System, December 1989.

MDHES/WQB, Field Investigation Report, Prepared by Terry Webster and Pete Strazdus, June 26, 1992.

MDSL/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for U.S. Grant Mine, Prepared by Northern Engineering and Testing, August 11, 1987.

MDSL/AMRB Files, Miscellaneous Analytical Data, Prepared by MSE, Inc., and Energy Laboratories, Inc., 1987-1994.

MDSL/AMRB Files, Montana Cultural Resource Inventory Form for U.S. Grant Mine, Prepared by Dames & Moore, September 19, 1989.

USGS, Topographic Map, Virginia City, Montana, 7 1/2 minute Quadrangle, 1988.

LABORATORY ANALYTICAL DATA

**U.S. GRANT MINE/MILLSITE
PA NO. 29-095**

U.S. Grant PA# 29-095
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - FLAMMANG
INVESTIGATION DATE: 07/18/94

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	Ag (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
29-095-SE1	1.4 U	10.5 U	202	1.3 U	19.8	78.0	45.6	28000	0.35 J	520	60.8	53.6	16.2 UJ	114	NR
29-095-SE2	0.9 U	6.9 U	190	0.8 U	25.6	81.7	36.6	35100	0.31 J	609	90.7	36.7	10.6 UJ	97.9	NR
29-095-TP1	22.6	143	87.8	0.8 U	3.6	10.0	759	108000	0.16 J	680	4.5	13700	124 J	13100	1.715
29-095-TP2	28.9	10.0	123	1.6	6.6	16.9	125	17700	0.27 J	299	14.3	468	10.4 UJ	338	<0.276
29-095-WR1	6.8	31.6	181	1.8	13.2	30.4	74.7	23600	0.42 J	743	23.7	1100	9.2 UJ	224	NR
29-095-WR2	39.9	10.9	73.7	4.9	8.0	10.1	127	15900	0.38 J	421	7.6	855	9.5 UJ	265	NR
BACKGROUND	0.8 U	9.2	210	0.7 U	8.6	37.1 JX	19.5 JX	19700	0.06 J	678	24.6 JX	14.8	9.0 UJ	101 JX	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL POTENT.		SULFUR ACID BASE POTENT.		PYRITIC SULFUR		ORGANIC SULFUR		PYRITIC SULFUR		SULFUR ACID BASE POTENT.	
	%	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t
29-095-TP1	0.20	6.25	40.4	34.2	0.13	34.2	0.02	0.05	0.05	0.62	39.8			
29-095-TP2	0.04	1.25	19.6	18.3	0.03	18.3	<0.01	0.01	0.01	0.00	19.6			
29-095-WR1	0.01	0.31	19.4	19.0	0.01	19.0	<0.01	<0.01	0.00	0.00	19.4			
29-095-WR2	0.16	5.00	61.3	56.3	0.06	56.3	0.01	0.09	0.31	61.0				

WATER MATRIX ANALYSES

Metals in Water
Results in ug/L

FIELD ID	Ag	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn (mg CaCO3/L)	HARDNESS CALC.
29-095-AD1	0.12 U	1.4	39.3	4.0 U	8.4 U	6.8 U	5.9 U	123 U	0.08	2.3 U	14.4 U	0.7	51.6 U	15.6 U	126
29-095-GW1	0.12 U	2.9	83.1	4.0 U	8.4 U	6.8 U	10.6 JX	26.5	0.16	4.6	14.4 U	1.1 U	55.8	15.6 U	177
29-095-GW2	0.12 U	4.3	83.4	4.0 U	8.4 U	6.8 U	7.2 JX	19.5	0.18	5.2	14.4 U	1.1 U	51.6 U	15.6 U	178
29-095-GW3	0.12 U	1.1	77.1	4.0 U	8.4 U	6.8 U	9.8	196	0.09	4.4	14.4 U	2.3	51.6 U	524	175
29-095-GW4	0.12 U	1.1 U	5.5 U	4.0 U	8.4 U	6.8 U	5.9 U	123 U	0.09	2.3 U	14.4 U	0.4 U	51.6 U	15.6 U	0.1
29-095-SW1	0.12 U	1.1 U	76.5	4.0 U	8.4 U	6.8 U	5.9 U	547	0.08	34.1	14.4 U	0.9	51.6 U	16.1	164
29-095-SW2	0.12 U	1.2	78.5	4.0 U	8.4 U	6.8 U	160	384	0.08 U	46.0	14.4 U	0.9	51.6 U	15.9	163

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Wet Chemistry
Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
29-095-AD1	244	<5	18	1.1	NR
29-095-GW1	185	<5	11	0.06	<0.005
29-095-GW2	246	<5	10	0.06	<0.005
29-095-GW3	218	<5	14	0.07	<0.005
29-095-GW4	NR	NR	NR	NR	<0.005
29-095-SW1	195	<5	12	0.07	<0.005
29-095-SW2	159	<5	9	0.08	<0.005

LEGEND

- SE1 - Upgradient 200' above mill building.
 SE2 - Downgradient, across from Fairweather Memorial, approx. 500' from base of TP1.
 TP1 - Composite of subsamples TP1A-1 through 1A-4.
 TP2 - Composite of subsamples TP2A, 2B-1, and 2B-2.
 WR1 - Composite of subsamples WR1 through 3.
 WR2 - Composite of subsamples WR2A and 4B.
 BACKGROUND - From the Belle Mine (29-098-SS1).
- AD1 - Collected at pond of Adit #1.
 GW1 - Monitoring well at center of base of TP1 den.
 GW2 - Duplicate of GW1.
 GW3 - Drinking well sampled from outside flume.
 GW4 - QA/QC sample.
 SW1 - Same as sample 29-095-SE1.
 SW2 - Same as sample 29-095-SE2.

XRF ANALYSIS RESULTS

**U.S. GRANT MINE/MILLSITE
PA NO. 29-095**

Mine Name: U.S. Grant PA# 29-095
XRF Field Analyses
Results in PPM

XRF SAMPLE I.D.	CrHI	K	Ca	Ti	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Sr
29-095-ORE	597.226 *	15908.6	41234.3	4725.45		1096.9 *	58818		234.021 *		231.551 *	153.506 *	223.892
29-095-TP1A1		23383.7	14697.9	1058.84		765.086 *	49668.2			143.439 *	1168.47		57.2609
29-095-TP1A2		10050.7	50118.1	362.835 *		1666.03 *	191115	1523.37 *		887.787	18567.6		171.662
29-095-TP1A3		28646.5	9736.65	1066.1			26064.6				700	119.675 *	83.4278
29-095-TP1A4		33403.3	8656.79	1076.11			22231.2				496.493		76.1658
29-095-TP1-COMP		23624.4	18046.1	838.69		885.974 *	67146.4	777.125 *		200.143 *	4602.81		99.2338
29-095-TP2A		36358.2	8335.99	1114.51			22768.7				305.88		89.3832
29-095-TP2B1		33696.7	7082.81	861.914			18392				327.353		84.7047
29-095-TP2B2		35303.5	7061.27	961.294			19288.2				332.408		90.2491
29-095-TP2-COMP		31216.1	6674.96	888.971			18928.5				350.428		81.2767
29-095-TP2-COMP-DUP		32046.8	6905.8	655.791 *			19098.2				325.34		81.0435
29-095-WR1		32548.9	14370.6	2594.37		1039.76 *	48275.3			101.936 *	1170.87		84.0522
29-095-WR1-COMP		35301.9	20445.9	3844.28		1310.99 *	57348.3				417.583	114.857 *	115.529
29-095-WR2	815.703 *	46031.2	7694.12	1149.72 *		2747.32	51970.8				478.182		99.9112
29-095-WR2-COMP		37341.8	27596.9	1920.21		1135.55 *	50553.1			131.414 *	861.38		161.585
29-095-WR3		29827.5	25628.8	5129.8		1796.16 *	65702.5				373.416	114.568 *	108.23
29-095-WR4A		35220.3	17960.7	1900.12		1491.73 *	42718.4			217.778 *	458.117		169.505
29-095-WR4B		36987.1	20118.5	1948.27		1229.27 *	41733.5			168.424 *	493.88		187.02

XRF SAMPLE I.D.	Zr	Hg	Mo	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th
29-095-ORE	201.214				30.1657 *				1169.44			
29-095-TP1A1	213.983		37.7028	1954.66	80.0283 *				416.336			
29-095-TP1A2	103.638		28.5944 *	12742.8	67.0231 *			476.497	78.8631 *			
29-095-TP1A3	329.154		26.6271 *	547.056	73.9173				472.514			
29-095-TP1A4	261.129		37.8441	460.655	70.7691 *			49.1275 *	536.394			
29-095-TP1-COMP	209.199		32.6065 *	3615.32	72.545 *			192.528 *	393.9			
29-095-TP2A	305.202		25.3713 *	325.953	72.5777				592.22			16.2018 *
29-095-TP2B1	248.731		24.8062 *	322.293	80.8018				647.143			
29-095-TP2B2	251.721		35.4694	322.179	89.382				561.484			
29-095-TP2-COMP	251.594		26.6816 *	291.585	73.4378				522.792			
29-095-TP2-COMP-DUP	250.607		28.4921 *	305.338	73.2366				516.135			
29-095-WR1	228.609		10.8195 *	716.366	113.536				512.62	138.261 *		
29-095-WR1-COMP	354.638			662.636	136.802				749.852			
29-095-WR2	194.492		23.9374 *	2388.38	110.98				941.243			18.3064 *
29-095-WR2-COMP	235.288		80.596	979.777	102.464				628.134			
29-095-WR3	388.264			221.643	148.47				816.964			
29-095-WR4A	295.391		27.6896 *	457.996	98.8503				606.638			14.4855 *
29-095-WR4B	215.574		30.9665 *	492.142	100.761				722.095			

* = Estimated Quantity

\$ = Unvalidated Data

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**U.S. GRANT
PA NO. 29-095**

AIMSS SCORESHEET

SITE NAME:
PA NUMBER:

U.S. Grant
29-095

LINE NO.		GROUNDWATER PATHWAY	
1		OBSERVED RELEASE	0
2		EXCEEDENCES	0
3A	GW - LIKELIHOOD OF RELEASE	CONTAINMENT	10
3B		GW DEPTH	20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B 200
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C 200
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 49.409
6		WELLS - 1 MI. x 2.5	17.5
7	GW - TARGETS	WELLS - 1 TO 4 MI	22
8		NEAREST WELL	10
9		TARGETS SCORE	LINES 6 + 7 + 8 49.5
10		GROUNDWATER SCORE	LINES 4 x 5 x 9 489149
SURFACE WATER PATHWAY			
11		OBSERVED RELEASE	300
12	SW - LIKELIHOOD OF RELEASE	EXCEEDENCES	50
13A		CONTAINMENT	10
13B		DISTANCE TO SW	10
13C		POTENTIAL TO RELEASE	LINES 13A x 13B 100
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C 450
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 54.977
16		DRINKING WATER POP'N	0
17		IMPACTED DRAINAGE	0
18		WETLANDS	10
19	SW - TARGETS	FISHERY	1
20		RECREATION	5
21		IRRIGATION/STOCK	2
22		T & E SPECIES HABITAT	0
23		TARGETS SCORE	SUM LINES 16 THRU 22 18
24		SURFACE WATER SCORE	LINES 14 x 15 x 23 445314
AIR PATHWAY			
25		OBSERVED RELEASE	200
26A	AIR - LIKELIHOOD OF RELEASE	CONTAINMENT	5
26B		DISTANCE TO POPULATION	20
26C		POTENTIAL TO RELEASE	LINES 26A x 26B 100
27		LIKELIHOOD SCORE	LINES 25 + 26C 300
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 1.731
29		POPULATION - 4 MILES	100
30		NEAREST RESIDENCE	10
31	AIR - TARGETS	WETLANDS	0
32		PARKS / WILDERNESS	0
33		T & E SPECIES HABITAT	0
34		TARGETS SCORE	SUM LINES 29 THRU 33 110
35		AIR PATHWAY SCORE	LINES 27 x 28 x 34 57123
DIRECT CONTACT PATHWAY			
36		OBSERVED EXPOSURE	200
37A	LIKELIHOOD OF EXPOSURE	ACCESSIBILITY	10
37B		DISTANCE TO POPULATION	20
37C		POTENTIAL EXPOSURE	LINES 37A x 37B 200
38		LIKELIHOOD SCORE	LINES 36 + 37C 400
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 1.560
40	DIRECT CONTACT	POPULATION - 1 MILE	100
41	TARGETS	NEAREST RESIDENCE	10
42		RECREATIONAL USE	0
43		TARGETS SCORE	SUM LINES 40 THRU 42 110
44		DIRECT CONTACT SCORE	LINES 38 x 39 x 43 68640
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE (LINES 10 + 24 + 35 + 44) / 100,000		10.60

			SITE NAME:	U.S. Grant
			PA NUMBER:	29-095
LINE NO.		<u>SITE SAFETY</u>		
1	THREAT	ACCESSIBILITY		10
2		OPEN SHAFTS	100 EA.	0
3		OPEN ADITS	50 EA.	250
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	75
5		HAZ. STRUCTURES	40 EA.	40
6		EXPLOSIVES		100
7		HAZ. MATERIALS		50
8		HAZARDS SCORE	SUM LINES 2 THRU 7	515
9		POPULATION - 1 MILE		100
10	TARGETS	NEAREST RESIDENCE		10
11		RECREATIONAL USE		0
12		TARGETS SCORE	SUM LINES 9 THRU 11	110
13		SITE SAFETY SCORE	(LINES 1 x 8 x 12) / 1,000	566.50

SUMMARY OF HISTORICAL ANALYTICAL DATA
FROM OTHER SOURCES

STATE HEALTH DEPT.

WATER QUALITY BUREAU

HELENA, MONTANA 59620

STATE MONTANA

COUNTY MADISON

LAT.-LONG. 451657N 1115623W

SAMPLE LOCATION 6S 3W 26CBA

STATION CODE

ANALYSIS NUMBER 86W2719

DATE SAMPLED 12-03-86

DRAINAGE BASIN 041C -RUBY RIVER

TIME SAMPLED 1215

WATER FLOW RATE

METHOD SAMPLED GRAB

FLOW MEASUREMENT METHOD

SAMPLE SOURCE WELL

ALTITUDE OF LAND SURFACE

WATER USE MULTIPLE

TOTAL WELL DEPTH BELOW LS 40 FT (M)

AQUIFER(S)

SWL ABOVE(+) OR BELOW LS

SAMPLED BY WQBH

SAMPLE DEPTH BELOW SURFACE

SAMPLING SITE: US GRANT NINE MONITORING WELL

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	39.9✓	1.991	BICARBONATE (HCO3)		
MAGNESIUM (MG)	16.5✓	1.357	CARBONATE (CO3)		
SODIUM (NA)			CHLORIDE (CL)		
POTASSIUM (K)			SULFATE (SO4)		
			FLUORIDE (F)		
			PHOSPHATE (PO4 AS P)		
			NO3+NO2 (TOT AS N)		

SUM CATIONS	56.4	3.348	SUM ANIONS	0.0	0.000
-------------	------	-------	------------	-----	-------

LABORATORY PH

7.71✓

TOT HARDNESS (MG/L-CACO3)

168

FIELD WATER TEMPERATURE (C)

TOT ALKALINITY (MG/L-CACO3)

SUM-DISS, IONS MEAS. (MG/L)

LABORATORY TURBIDITY (NTU)

LAB CONDUCTIVITY-UMHDS-25C

332✓

SODIUM ADSORPTION RATIO

A D D I T I O N A L

P A R A M E T E R S

ARSENIC, TR (MG/L AS AS)

<.001✓

CADMIUM, TR (MG/L AS CD)

<.005✓

COPPER, TR (MG/L AS CU)

.01✓

LEAD, TR (MG/L AS PB)

<.05✓

ZINC, TR (MG/L AS ZN)

1.56✓

IRON, TR (MG/L AS FE)

1.07✓

REMARKS: BASELINE MONITORING FOR GWPCS PERMIT APPLICATION

SAMPLED AT TAP IN TRAILER

NOTES: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS/L UG/L=MICROGRAMS/L

ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED. TOT=TOTAL SUSP=SUSPENDED

TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M=METERS

SAMPLE NO- SAMPLER-JLA HANDLING-2100 ANALYST-WAT LAB-0543 SCAN-

COMPLETED-01/05/87 COMPUTER RUN-01/23/87 DATA-0684/PGM-0984 FUND-

STND DEV. ION BALANCE=

CA MG NA K CL SO4 HCO3 CO3

MPDES-

59.5 40.5 0.0 0.0 0.0 0.0 0.0 0.0

CALC. MEQ/L=

3.270 TO

3.614

87

STATE HEALTH DEPT.

WATER QUALITY BUREAU

HELENA, MONTANA 59620

STATE	MONTANA	COUNTY	MADISON
LAT.-LONG.	451657N 1115623W	SAMPLE LOCATION	6S 3W 26CBA
STATION CODE		ANALYSIS NUMBER	86W2720
DATE SAMPLED	12-03-86	DRAINAGE BASIN	041C -RUBY RIVER
TIME SAMPLED	1210	WATER FLOW RATE	
METHOD SAMPLED	GRAB	FLOW MEASUREMENT METHOD	
SAMPLE SOURCE	MINE DRAIN	ALTITUDE OF LAND SURFACE	
WATER USE	UNUSED	TOTAL WELL DEPTH BELOW LS	
AQUIFER(S)		SWL ABOVE(+) OR BELOW LS	
SAMPLED BY	WQBH	SAMPLE DEPTH BELOW SURFACE	

SAMPLING SITE: US GRANT MINE LEVEL 3 ADIT DISCHARGE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	33.1 ✓	1.652	BICARBONATE(HCO3)		
MAGNESIUM (MG)	11.6 ✓	0.954	CARBONATE (CO3)		
SODIUM (NA)			CHLORIDE (CL)		
POTASSIUM (K)			SULFATE (SO4)		
			FLUORIDE (F)		
			PHOSPHATE(PO4 AS P)		
			NO3+NO2 (TOT AS N)		
SUM CATIONS	44.7	2.606	SUM ANIONS	0.0	0.000
LABORATORY PH		8.27 ✓	TOT HARDNESS(MG/L-CACO3)		130
FIELD WATER TEMPERATURE (C)			TOT ALKALINITY(MG/L-CACO3)		
SUM-DISS. IONS MEAS.(MG/L)			LABORATORY TURBIDITY (NTU)		
LAB CONDUCTIVITY-UMHOS-25C		282 ✓	SODIUM ADSORPTION RATIO		
A D D I T I O N A L			P A R A M E T E R S		
ARSENIC,TR (MG/L AS AS)		.001 ✓	CADMIUM, TR (MG/L AS CD)		<.005 ✓
COPPER,TR (MG/L AS CU)		<.01 ✓	LEAD,TR (MG/L AS PB)		<.05 ✓
ZINC,TR (MG/L AS ZN)		<.005 ✓	IRON,TR (MG/L AS FE)		<.01 ✓

REMARKS: BASELINE MONITORING FOR GWPCS PERMIT APPLICATION

SAMPLED AT ADIT MOUTH

NOTES: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS/L UG/L=MICROGRAMS/L
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED. TOT=TOTAL SUSP=SUSPENDED
 TR=TOTAL RECOVERABLE (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M=METERS

SAMPLE NO- SAMPLER-JLA HANDLING-2100 ANALYST-WAT LAB- SCAN-N
 COMPLETED-01/05/87 COMPUTER RUN-01/23/87 DATA-0684/PGM-0984 FUND-0543
 STND DEV. ION BALANCE= CA MG NA K CL SO4 HCO3 CO3 NO3
 MPDES- 63.4 36.6 0.0 0.0 0.0 0.0 0.0 0.0 0.0
 CALC. MEQ/L= 2.758 TO 3.048 86W2720

STATE	MONTANA	COUNTY	MADISON
LAT.-LONG.	451717N 1115623W	SAMPLE LOCATION	65 3W 2688D
STATION CODE		ANALYSIS NUMBER	79W3038
DATE SAMPLED	12-12-79	DRAINAGE BASIN	041C -RUBY RIVER
TIME SAMPLED	1130	WATER FLOW RATE	3. CFS(E)
METHOD SAMPLED	GRAB	FLOW MEASUREMENT METHOD	NOT MEASURED
SAMPLE SOURCE	STREAM	ALTITUDE OF LAND SURFACE	
WATER USE	MULTIPLE	TOTAL WELL DEPTH BELOW LS	
AQUIFER(S)		SKL ABOVE(+) OR BELOW LS	
SAMPLED BY	WQBH	SAMPLE DEPTH BELOW SURFACE	

SAMPLING SITE: ALDER CR DIRECTLY BELOW R&D MINE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)			BICARBONATE(HCO3)		
MAGNESIUM (MG)			CARBONATE (CO3)		
SODIUM (NA)			CHLORIDE (CL)		
POTASSIUM (K)			SULFATE (SO4)		
			FLUORIDE (F)		
			PHOSPHATE(PO4 AS P)		
			NO3+NO2 (TOT AS N)		

SUM CATIONS	0.0	0.0	SUM ANIONS	0.0	0.000
-------------	-----	-----	------------	-----	-------

LABORATORY PH		TOT HARDNESS(MG/L-CAC03)	
FIELD WATER TEMPERATURE (C)	0.0	TOT ALKALINITY(MG/L-CAC03)	
-DISS. IONS MEAS.(MG/L)		LABORATORY TURBIDITY (NTU)	900.
AS CONDUCTIVITY-UMHOS-25C		SODIUM ADSORPTION RATIO	

A D D I T I O N A L		P A R A M E T E R S	
SEDIMENT,TOT,SUSP (MG/L)	4070.	ARSENIC,TR (MG/L AS AS)	0.004
COPPER,TR (MG/L AS CU)	.21	LEAD,TR (MG/L AS PB)	.07
ZINC,TR (MG/L AS ZN)	.49	MERCURY, TR (MG/L AS HG)	< .0002
IRON,TR (MG/L AS FE)	.14		

REMARKS: SURV. MON

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED. TOT=TOTAL SUSP=SUSPENDED
 (M)=MEASURED(R)=REPORTED (L)=ESTIMATED M=METERS TR=TOTAL RECOVERABLE

SAMPLE NO	SAMPLER	ROS	HANDLING	2100	ANALYST	JAH	LAB	WQBH
COMPLETED	01-02-80	COMPUTER RUN	01/28/80	DATA	0976/PR0G	0876	FUND	6150
STD DEV. ION BALANCE	0.00	CA	MG	NA	K	CL	SO4	HCO3
SEGMENT	MPDES	0.0	0.0	0.0	0.0	33.0	33.3	0.0
CALC. MEQ/L=	INSUFFICIENT DATA							79W3038

STATE	MONTANA	COUNTY	HADISON
LAT.-LONG.	451711N 11156 4W	SAMPLE LOCATION	6S 3W 268DA
STATION CODE		ANALYSIS NUMBER	79W3037
DATE SAMPLED	12-12-79	DRAINAGE BASIN	041C -RUBY RIVER
TIME SAMPLED	1200	WATER FLOW RATE	3. CFS(E)
METHOD SAMPLED	GRAB	FLOW MEASUREMENT METHOD	NOT MEASURED
SAMPLE SOURCE	STREAM	ALTITUDE OF LAND SURFACE	
WATER USE	MULTIPLE	TOTAL WELL DEPTH BELOW LS	
AQUIFER(S)		SWL ABOVE(+) OR BELOW LS	
SAMPLED BY	ROBH	SAMPLE DEPTH BELOW SURFACE	

(SAMPLING SITE: ALDER CR ABOVE RED MINE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)			BICARBONATE (HCO3)		
MAGNESIUM (MG)			CARBONATE (CO3)		
SODIUM (NA)			CHLORIDE (CL)		
POTASSIUM (K)			SULFATE (SO4)		
			FLUORIDE (F)		
			PHOSPHATE (PO4 AS P)		
			NO3+NO2 (TOT AS N)		

SUM CATIONS	0.0	0.0	SUM ANIONS	0.0	0.000
-------------	-----	-----	------------	-----	-------

LABORATORY PH		TOT HARDNESS (MG/L-CACCO3)	
FIELD WATER TEMPERATURE (C)	0.0	TOT ALKALINITY (MG/L-CACCO3)	
DISS. IONS MEAS. (MG/L)		LABORATORY TURBIDITY (NTU)	1.1
LAB CONDUCTIVITY-UMHDS-25C		SODIUM ADSORPTION RATIO	

A D D I T I O N A L		P A R A M E T E R S	
SEDIMENT, TOT, SUSP (MG/L)	0.9	ARSENIC, TR (MG/L AS AS)	< .001
COPPER, TR (MG/L AS CU)	< .01	LEAD, TR (MG/L AS PB)	< .05
ZINC, TR (MG/L AS ZN)	< .005	MERCURY, TR (MG/L AS HG)	< .0002
IRON, TR (MG/L AS FE)	.08		

REMARKS: SURV MON

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED. TOT=TOTAL SUSP=SUSPENDED
 (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M=METERS TR=TOTAL RECOVERABLE

SAMPLE NO	SAMPLER	ROB	HANDLING	2100	ANALYST	JAH	LAB	ROBH
COMPLETED	01-02-80	COMPUTER RUN	01/29/80	DATA	0975/PRUG	0876	FUND	6150
STAD DEV.	ION BALANCE	0.00	CA	MG	NA	K	CL	SO4
SEDIMENT	MPDES	0.0	0.0	0.0	0.0	33.3	33.3	0.0
CALC.	MEQ/L=	INSUFFICIENT DATA						79W3037

STATE	MONTANA	COUNTY	MADISON
LAT.-LONG.	451724N 1115632W	SAMPLE LOCATION	6S 3W 2688B
STATION CODE		ANALYSIS NUMBER	79X3039
DATE SAMPLED	12-12-79	DRAINAGE BASIN	341C--RUBY RIVER
TIME SAMPLED	1220	WATER FLOW RATE	3. CFS(E)
METHOD SAMPLED	GRAB	FLOW MEASUREMENT METHOD	NOT MEASURED
SAMPLE SOURCE	STREAM	ALTITUDE OF LAND SURFACE	
WATER USE	MULTIPLE	TOTAL WELL DEPTH BELOW LS	
AQUIFER(S)		SWL ABOVE(+) OR BELOW LS	
SAMPLED BY	WGBH	SAMPLE DEPTH BELOW SURFACE	

SAMPLING SITE: ALDER CR 1/4 MI BELOW MINE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)			BICARBONATE (HCO3)		
MAGNESIUM (MG)			CARBONATE (CO3)		
SODIUM (NA)			CHLORIDE (CL)		
POTASSIUM (K)			SULFATE (SO4)		
			FLUORIDE (F)		
			PHOSPHATE (PO4 AS P)		
			NO3+NO2 (TOT AS N)		

SUM CATIONS	0.0	0.0	SUM ANIONS	0.0	0.000
-------------	-----	-----	------------	-----	-------

LABORATORY PH		TOT HARDNESS (MG/L-CAC03)	
FIELD WATER TEMPERATURE (C)	0.0	TOT ALKALINITY (MG/L-CAC03)	
DISS. IONS MEAS. (MG/L)		LABORATORY TURBIDITY (NTU)	5.4
LAB CONDUCTIVITY-UMHOS-25C		SODIUM ADSORPTION RATIO	

A D D I T I O N A L P A R A M E T E R S			
SEDIMENT, TOT, SUSP (MG/L)	8.4	ARSENIC, TR (MG/L AS AS)	< .001
COPPER, TR (MG/L AS CU)	< .01	LEAD, TR (MG/L AS PB)	< .05
ZINC, TR (MG/L AS ZN)	.005	MERCURY, TR (MG/L AS HG)	< .0002
IRON, TR (MG/L AS FE)	.21		

REMARKS: SURV. MON

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED. TOT=TOTAL SUSP=SUSPENDED
(M)=MEASURED(R)=REPORTED (E)=ESTIMATED M=METERS TR=TOTAL RECOVERABLE

SAMPLE NO	SAMPLER	ROB	HANDLING	2100	ANALYST	JAH	LAB	WGBH
COMPLETED	01-02-80	COMPUTER RUN	01/23/80	DATA	0975/PR06	0876	FUND	0150
STAD DEV.	ION BALANCE	0.00	CA	MG	NA	K	CL	SO4
SEDIMENT	MPDES	0.0	0.0	0.0	0.0	33.0	33.0	0.0
CALC.	MEQ/L=	INSUFFICIENT DATA						79X3039

STATE	MONTANA	COUNTY	MADISON
LAT.-LONG.	451717N 1115623W	SAMPLE LOCATION	65 3W 2688D
STATION CODE		ANALYSIS NUMBER	79W3038
DATE SAMPLED	12-12-79	DRAINAGE BASIN	041C -RUBY RIVER
TIME SAMPLED	1130	WATER FLOW RATE	3. CFS(E)
METHOD SAMPLED	GRAB	FLOW MEASUREMENT METHOD	NOT MEASURED
SAMPLE SOURCE	STREAM	ALTITUDE OF LAND SURFACE	
WATER USE	MULTIPLE	TOTAL WELL DEPTH BELOW LS	
AQUIFER(S)		SKL ABOVE(+) OR BELOW LS	
SAMPLED BY	WQBH	SAMPLE DEPTH BELOW SURFACE	

(SAMPLING SITE: ALDER CR DIRECTLY BELOW RCD MINE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)			BICARBONATE(HCO3)		
MAGNESIUM (MG)			CARBONATE (CO3)		
SODIUM (NA)			CHLORIDE (CL)		
POTASSIUM (K)			SULFATE (SO4)		
			FLUORIDE (F)		
			PHOSPHATE(PO4 AS P)		
			NO3+NO2 (TOT AS N)		

SUM CATIONS	0.0	0.0	SUM ANIONS	0.0	0.000
-------------	-----	-----	------------	-----	-------

LABORATORY PH		TOT HARDNESS(MG/L-CAC03)	
FILLED WATER TEMPERATURE (C)	0.0	TOT ALKALINITY(MG/L-CAC03)	
(X) DISS. IONS MEAS.(MG/L)		LABORATORY TURBIDITY (NTU)	900.
LAB CONDUCTIVITY-UMHOS-25C		SODIUM ADSORPTION RATIO	

A D D I T I O N A L P A R A M E T E R S			
SEDIMENT.TOT.SUSP (MG/L)	4070.	ARSENIC.TR (MG/L AS AS)	0.004
COPPER.TR (MG/L AS CU)	0.21	LEAD.TR (MG/L AS PB)	0.07
ZINC.TR (MG/L AS ZN)	0.49	MERCURY. TR (MG/L AS HG)	< 0.0002
IRON.TR (MG/L AS FE)	0.14		

REMARKS: SURV. MON

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLEQUIVALENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DICS) EXCEPT AS NOTED. TOT=TOTAL SUSP=SUSPENDED
 (X)= MEASURED (R)=REPORTED (L)=ESTIMATED M=METERS TR=TOTAL RECOVERABLE

SAMPLE NO	SAMPLER	ROS	HANDLING	2100	ANALYST	JAH	LAB	WQBH
COMPLETED	01-02-80	COMPUTER RUN	01/28/80	DATA	0976/PRUG	0876	FUND	8150
STAND DEV. ION BALANCE	0.00	CA	MG	NA	K	CL	SO4	HCO3
COEFFICIENT	MPDES	0.0	0.0	0.0	0.0	33.0	33.3	0.0
CALC. MEQ/L=	INSUFFICIENT DATA							79W3038

STATE	MONTANA	COUNTY	MADISON
LAT.-LONG.	451724N 1115632W	SAMPLE LOCATION	65 JW 26588
STATION CODE		ANALYSIS NUMBER	79W3039
DATE SAMPLED	12-12-79	DRAINAGE BASIN	341C -RUBY RIVER
TIME SAMPLED	1220	WATER FLOW RATE	3. CFS (E)
METHOD SAMPLED	GRAB	FLOW MEASUREMENT METHOD	NOT MEASURED
SAMPLE SOURCE	STREAM	ALTITUDE OF LAND SURFACE	
WATER USE	MULTIPLE	TOTAL WELL DEPTH BELOW LS	
AQUIFER(S)		SWL ABOVE(+) OR BELOW LS	
SAMPLED BY	WOSH	SAMPLE DEPTH BELOW SURFACE	

(SAMPLING SITE: ALDER CR 1/4 MI BELOW MINE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)			BICARBONATE (HCO3)		
MAGNESIUM (MG)			CARBONATE (CO3)		
SODIUM (NA)			CHLORIDE (CL)		
POTASSIUM (K)			SULFATE (SO4)		
			FLUORIDE (F)		
			PHOSPHATE (PO4 AS P)		
			NO3+NO2 (TOT AS N)		

SUM CATIONS	0.0	0.0	SUM ANIONS	0.0	0.000
-------------	-----	-----	------------	-----	-------

LABORATORY PH		TOT HARDNESS (MG/L-CAC03)	
FIELD WATER TEMPERATURE (C)	0.0	TOT ALKALINITY (MG/L-CAC03)	
DISS. IONS MEAS. (MG/L)		LABORATORY TURBIDITY (NTU)	5.4
W CONDUCTIVITY-UMHOS-25C		SODIUM ADSORPTION RATIO	

A D D I T I O N A L		P A R A M E T E R S	
SEDIMENT, TOT, SUSP (MG/L)	0.4	ARSENIC, TR (MG/L AS AS)	< .001
COPPER, TR (MG/L AS CU)	< .01	LEAD, TR (MG/L AS PB)	< .05
ZINC, TR (MG/L AS ZN)	.005	MERCURY, TR (MG/L AS HG)	< .0002
IRON, TR (MG/L AS FE)	.21		

REMARKS: SURV. MON

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED. TOT=TOTAL SUSP=SUSPENDED
 (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M=METERS TR=TOTAL RECOVERABLE

SAMPLE NO	SAMPLER	ROB	HANDLING	2100	ANALYST	JAH	LAD	WOSH
COMPLETED	01-02-80	COMPUTER RUN	31/23/80	DATA	3975/PROG	0878	FUND	6150
STD DEV.	ION BALANCE	0.00	CA	MG	NA	K	CL	SO4
SECMENT	MPDES	0.0	0.0	0.0	0.0	33.0	33.3	0.0
CALC. MEQ/L= INSUFFICIENT DATA								79W3039

STATE HEALTH DEPT.

WATER QUALITY BUREAU

HELENA, MONTANA 59601

STATE	MONTANA	COUNTY	MADISON
LAT.-LONG.	451711N 11156 4W	SAMPLE LOCATION	6S 3W 268DA
STATION CODE		ANALYSIS NUMBER	7913037
DATE SAMPLED	12-12-79	DRAINAGE BASIN	041C -RUBY RIVER
TIME SAMPLED	1200	WATER FLOW RATE	3. CFS(E)
METHOD SAMPLED	GRAB	FLOW MEASUREMENT METHOD	NOT MEASURED
SAMPLE SOURCE	STREAM	ALTITUDE OF LAND SURFACE	
WATER USE	MULTIPLE	TOTAL WELL DEPTH BELOW LS	
AQUIFER(S)		SNL ABOVE(+) OR BELOW LS	
SAMPLED BY	ROBH	SAMPLE DEPTH BELOW SURFACE	

SAMPLING SITE: ALDER CR ABOVE RGD MINE

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)			BICARBONATE (HCO3)		
MAGNESIUM (MG)			CARBONATE (CO3)		
SODIUM (NA)			CHLORIDE (CL)		
POTASSIUM (K)			SULFATE (SO4)		
			FLUORIDE (F)		
			PHOSPHATE (PO4 AS P)		
			NO3+NO2 (TOT AS N)		

SUM CATIONS

0.0

0.0

SUM ANIONS

0.0

0.000

LABORATORY PH		TOT HARDNESS (MG/L-CACCO3)	
FIELD WATER TEMPERATURE (C)	0.0	TOT ALKALINITY (MG/L-CACCO3)	
DISS. IONS MEAS. (MG/L)		LABORATORY TURBIDITY (NTU)	1.1
LAB CONDUCTIVITY-UMHDS-25C		SODIUM ADSORPTION RATIO	

A D D I T I O N A L		P A R A M E T E R S	
SEDIMENT, TOT, SUSP (MG/L)	0.9	ARSENIC, TR (MG/L AS AS)	< .001
COPPER, TR (MG/L AS CU)	< .01	LEAD, TR (MG/L AS PB)	< .05
ZINC, TR (MG/L AS ZN)	< .005	MERCURY, TR (MG/L AS HG)	< .0002
IRON, TR (MG/L AS FE)	.03		

REMARKS: SURV MON

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED. TOT=TOTAL SUSP=SUSPENDED
 (M)=MEASURED (R)=REPORTED (E)=ESTIMATED M=METERS TR=TOTAL RECOVERABLE

SAMPLE NO	SAMPLER	ROB	HANDLING	2100	ANALYST	JAH	LAB	ROBH
COMPLETED	01-02-80	COMPUTER RUN	01/29/80	DATA	0975/PROG	0876	FUND	6100
STANDARD	ION BALANCE	0.00	CA	MG	NA	K	CL	SO4
SEQUEST	MPDES	0.0	0.0	0.0	0.0	33.3	33.3	0.0
CALC.	MEQ/L=	INSUFFICIENT DATA						79W3037

REPORT DATE: August 5, 1992

CLIENT: Madison Mining

DATE/TIME SAMPLED: 07-02-92 / 1450

DATE RECEIVED: 07-06-92

FIELD ID: Tailings #001 tailings pond - various locations

MSE, Inc. Lab No.: S3909

T-Metals

As 41 mg/kg

Cd 4.5 mg/kg

Cu <0.6 mg/kg

Fe 25,500 mg/kg

Pb 945 mg/kg

Zn <3 mg/kg

Acid-Base Account

Total Sulfur	T.S. AB	Neut. Pot.	T.S. ABP	Sulfate Sulfur	Pyritic Sulfur	Organic Sulfur	PyrS AB	PyrS ABP
%	t/1000t	t/1000t	t/1000t	%	%	%	t/1000t	t/1000t
0.10	3.12	23.5	20.4	0.07	0.02	0.01	0.62	22.9

T.S. = Total Sulfur; AB = Acid; ABP = Acid Base Potential; PyrS = Pyritic Sulfur; Pyr & Org = Pyritic Sulfur & Organic Sulfur; Neut. Pot. = Neutralization Potential

GEW
Review



REPORT DATE: August 5, 1992

CLIENT: Madison Mining

DATE/TIME SAMPLED: 07-02-92 / 1400

DATE RECEIVED: 07-06-92

FIELD ID: #001/#002 Culvert Exit - Below tailings pond

MSE, Inc. Lab No.: WE380/WE381

pH 6.72 SU

Specific conductance 302 $\mu\text{mhos/cm}$ @ 25°C

T-Metals

As <0.001 mg/L

Cd 0.0001 mg/L

Cu 0.005 mg/L

Fe 0.265 mg/L

Pb 0.004 mg/L

Zn 0.015 mg/L

GFW
Review

REPORT DATE: August 5, 1992

CLIENT: Madison Mining

DATE/TIME SAMPLED: 07-02-92 / 1410

DATE RECEIVED: 07-06-92

FIELD ID: #003/#004 At Culvert - Above tailings pond - Alder Cr.

MSE, Inc. Lab No.: WE382/WE383

pH 8.60 SU

Specific conductance 302 μ mhos/cm @ 25°C

T-Metals

As <0.001 mg/L

Cd <0.0001 mg/L

Cu 0.003 mg/L

Fe 0.230 mg/L

Pb 0.003 mg/L

Zn 0.009 mg/L

GFW
Review



REPORT DATE: August 5, 1992

CLIENT: Madison Mining

DATE/TIME SAMPLED: 07-02-92 / 1430

DATE RECEIVED: 07-06-92

FIELD ID: #005/#006 At Well - outside office

MSE, Inc. Lab No.: WE384/WE385

pH 6.95 SU

Specific conductance 331 μ mhos/cm @ 25°C

T-Metals

As <0.001 mg/L

Cd <0.0001 mg/L

Cu 0.005 mg/L

Fe 0.277 mg/L

Pb 0.003 mg/L

Zn 0.318 mg/L

GFW
Review

Report for the Month of June 88

The following parameters are to be grab sampled and analyzed each month during operation and quarterly during periods of shutdown:

Parameter	Monitoring Well	Upstream Alder Creek Site	Downstream Alder Creek Site	Tailing Solution
pH (standard units)	6.8	7.2	7.0	7.4
Specific Conductance (umhos/cm @ 25° C)	265.	240.	250.	255.
Dissolved Arsenic (mg/l)	-0.005	-0.005	-0.005	-0.005
Dissolved Zinc (mg/l)	-0.01	0.15	-0.01	-0.01
Dissolved Cadmium (mg/l)	-0.005	-0.005	-0.005	-0.005
Dissolved Lead (mg/l)	-0.02	-0.02	-0.02	-0.02
Dissolved Copper (mg/l)	-0.01	-0.01	-0.01	-0.01
Dissolved Iron (mg/l)	-0.05	-0.05	-0.05	-0.05

PLEASE PRINT

Name of Company U.S. GRANT GOLD MINING COMPANY, MONTANA LTD.Address P.O. BOX 74, VIRGINIA CITY, MT. 59755VIRGINIA CITY, MT. 59755Telephone Number (406) 843-5387Sampler's Name MICHAEL ANTONIOLI / MIKE IS NOLONGER WITH USSignature *Conner Babcock*

Permit No. MGW PCS - 0035

Report for the Month of NOVEMBER 87

The following parameters are to be grab sampled and analyzed each month during operation and quarterly during periods of shutdown:

Parameter	Monitoring Well	Upstream Alder Creek Site	Downstream Alder Creek Site	AUDIT XXXXXX Solution
pH (standard units)	7.5	7.2	7.4	7.5
Specific Conductance (umhos/cm @ 25° C)	325.	325.	325.	325.
Dissolved Arsenic (mg/l)	-0.005	-0.005	-0.005	-0.005
Dissolved Zinc (mg/l)	0.27	0.27	0.27	0.27
Dissolved Cadmium (mg/l)	-0.005	-0.005	-0.005	-0.005
Dissolved Lead (mg/l)	-0.02	-0.02	-0.02	-0.02
Dissolved Copper (mg/l)	-0.01	-0.01	-0.01	-0.01
Dissolved Iron (mg/l)	-0.05	-0.05	-0.05	-0.05

PLEASE PRINT

Name of Company U.S. GRANT GOLD MINING COMPANY, MONTANA Ltd.

Address P.O. BOX 74

VIRGINIA CITY, MT. 59755

Telephone Number (406) 843-5387

Sampler's Name MICHAEL ANTONIOLI

Signature 

Permit No. MGW PCS-0035Report for the Month of MAY

The following parameters are to be grab sampled and analyzed each month during operation and quarterly during periods of shutdown:

Parameter	Monitoring Well	Upstream Alder Creek Site	Downstream Alder Creek Site	#3 Audit Tailing Solution
pH (standard units)	7.4	7.6	7.6	7.6
Specific Conductance (umhos/cm @ 25° C)	308	264	269	280
Dissolved Arsenic (mg/l)	<.005	<.005	<.005	<.005
Dissolved Zinc (mg/l)	.78	.01	0.02	.02
Dissolved Cadmium (mg/l)	<.001	<.001	<.001	<.001
Dissolved Lead (mg/l)	<.01	<.01	.01	<.01
Dissolved Copper (mg/l)	<.01	<.01	<.01	<.01
Dissolved Iron (mg/l)	didn't Test	didn't Test	didn't Test	didn't Test

Note: Mill not running in May, therefore no sample of Tailing solution available - phonecall w/ Johnsrud 7/7/87.

- FS

PLEASE PRINT

Name of Company U.S. GRANT GOLD MINING CO. MT. LTD.Address Box 74Virginia City, MT. 59255Telephone Number 843-5387Sampler's Name Robert JohnsonSignature Robert Johnson

Permit No. MCWPC3-0035Report for the Month of APRIL

The following parameters are to be grab sampled and analyzed each month during operation and quarterly during periods of shutdown:

Parameter	Monitoring Well	Upstream Alder Creek Site	Downstream Alder Creek Site	<i>Audit</i> Tailing Solution
pH (standard units)	7.0	7.4	7.4	7.4
Specific Conductance (umhos/cm @ 25° C)	301	268	274	279
Dissolved Arsenic (mg/l)	<.005	<.005	<.005	<.005
Dissolved Zinc (mg/l)	.93	.01	.01	<.01
Dissolved Cadmium (mg/l)	<.001	<.001	<.001	<.001
Dissolved Lead (mg/l)	<.01	<.01	<.01	<.01
Dissolved Copper (mg/l)	<.01	<.01	<.01	<.01
Dissolved Iron (mg/l)	.03	.19	.11	.03

PLEASE PRINT

Name of Company U. S. Grant Gold Mining Co.Address Box 74Virginia City, MT 59755Telephone Number 843-5387Sampler's Name Ralph A. JohnsonSignature Ralph A. Johnson



ENERGY LABORATORIES, INC.

P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325

LABORATORY REPORT

To: US Grant Gold Mining Co. (1)
Address: PO Box 74
Virginia City, Montana 59755
ATTN: Ralph Johnsrud

Lab No.: 86-12807
Date: 1-14-87 tab

WATER ANALYSIS

Monitoring Well
Sampled 12-22-86 @ 1700
Submitted 12-29-86

<u>CONSTITUENT</u>	<u>mg/l</u>
Potassium -----	2
Sodium -----	4
Calcium -----	41
Magnesium -----	17
Sulfate -----	13
Carbonate -----	0
Bicarbonate -----	189
Total Dissolved Solids @ 180°C ----	187
Total Hardness as CaCO3 -----	172
Specific Conductance @ 25°C -----	325. umhos/cm
pH -----	7.3 s.u.
Total Cyanide -----	<0.005

METALS (dissolved):

Arsenic -----	<0.005
Cadmium -----	<0.001
Copper -----	<0.01
Lead -----	<0.01
Mercury -----	<0.001
Zinc -----	1.06



ENERGY LABORATORIES, INC.

P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325

LABORATORY REPORT

To: US Grant Gold Mining Co. (1)
Address: PO Box 74
Virginia City, Montana 59755
ATTN: Ralph Johnsrud

Lab No.: 86-12806
Date: 1-14-87 tab

WATER ANALYSIS

Prop Line
Sampled 12-22-86 @ 1700
Submitted 12-29-86

<u>CONSTITUENT</u>	<u>mg/l</u>
Potassium -----	2
Sodium -----	3
Calcium -----	40
Magnesium -----	17
Sulfate -----	12
Carbonate -----	0
Bicarbonate -----	180
Total Dissolved Solids @ 180°C ----	177
Total Hardness as CaCO ₃ -----	167
Specific Conductance @ 25°C -----	310. umhos/cm
pH -----	7.8 s.u.
Total Cyanide -----	<0.005

METALS (dissolved):

Arsenic -----	<0.005
Cadmium -----	<0.001
Copper -----	<0.01
Lead -----	<0.01
Mercury -----	<0.001
Zinc -----	<0.01



ENERGY LABORATORIES, INC.

P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489

LABORATORY REPORT

TO: Ron Lane
ADDRESS: Madison Mining Corporation
P.O. Box 74
Virginia City, MT 59755

LAB NO.: 93-58225
DATE: 12/23/93 ag

WASTE ANALYSIS TOXICITY CHARACTERISTIC LEACHING PROCEDURE EPA SW-846 METHOD 1311

Submitted 12/13/93
Extracted 12/13/93

Metals	CAS No.	Regulatory Limit, mg/l	Minimum Reporting Limit, mg/l	Result, mg/l in Extract	Spike Percent Recovery	Date Analyzed
Arsenic	7440-38-2	5.0	0.5	<0.5	98	12/21/93
Barium	7440-39-3	100.0	10.0	<10	94	12/14/93
Cadmium	7440-43-9	1.0	0.1	<0.1	87	12/14/93
Chromium	7440-47-3	5.0	0.5	<0.5	93	12/14/93
Lead	7439-92-1	5.0	0.5	<0.5	84	12/14/93
Mercury	7439-97-6	0.2	0.02	<0.02	106	12/16/93
Selenium	7782-49-2	1.0	0.1	<0.1	89	12/16/93
Silver	7440-22-4	5.0	0.5	<0.5	76	12/14/93

RECEIVED

DEC 28 1993

MONT. DEPT. OF HEALTH & ENV. SCIENCES
WATER QUALITY BUREAU

Terry

DEC 28 1993

This is the results of
The TCLP. If you need any-
thing else please call me

R



ENERGY LABORATORIES, INC.

P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489

LABORATORY REPORT

TO: Madison Mining Corporation
ADDRESS: Box 156
Virginia City, MT 59755LAB NO: 93-9876
DATE: 03/15/93 jmwWATER ANALYSISSW Sec. 26-6S-3W, Madison County, MT
Well Sampled 03/05/93 @ 1400 by Ron Lane
Bottom Well #1, 18' Depth
Standing Water Level 6' Below Ground Surface
Submitted 03/10/93*Monitoring
Below
Impoundment*

<u>Constituent</u>	<u>mg/l (ppm)</u>	<u>Date Analyzed</u>
Specific Conductance @ 25°C	334 μ mhos/cm	03/11/93
pH	7.7 s.u.	03/11/93
<u>Dissolved Metals</u>		
Cadmium	<0.001	03/12/93
Copper	<0.01	03/12/93
Iron	0.65	03/12/93
Lead	<0.01	03/12/93
Zinc	0.01	03/12/93

*TERRY
Sorry for the
delay on these
my mistake
for*

RECEIVED

MAR 22 1993
MONT. DEPT. OF HEALTH & ENV. SCIENCES
WATER QUALITY BUREAU

ANALYTICAL SERVICE



ENERGY LABORATORIES, INC.

P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489

LABORATORY REPORT

TO: Madison Mining Corporation
ADDRESS: Box 156
Virginia City, MT 59755

LAB NO: 93-9877
DATE: 03/15/93 jmw

WATER ANALYSIS

SW Sec. 26-6S-3W, Madison County, MT
Well Sampled 03/05/93 @ 1400 by Ron Lane
Top Well #2, 45' Depth
Standing Water Level 22' Below Ground Surface
Submitted 03/10/93

*Drinking
Below
Impoundment*

<u>Constituent</u>	<u>mg/l (ppm)</u>	<u>Date Analyzed</u>
Specific Conductance @ 25°C	327 μ mhos/cm	03/11/93
pH	7.7 s.u.	03/11/93
<u>Dissolved Metals</u>		
Cadmium	<0.001	03/12/93
Copper	0.01	03/12/93
Iron	<0.03	03/12/93
Lead	<0.01	03/12/93
Zinc	0.31	03/12/93

RECEIVED

MAR 22 1993

MONT. DEPT. OF HEALTH & ENV. SCIENCES
WATER QUALITY BUREAU



ENERGY LABORATORIES, INC.

P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489

LABORATORY REPORT

TO: Madison Mining
ADDRESS: Box 156
Virginia City, MT 59755

LAB NO.: 94-24242
DATE: 06/16/94 jmw

WATER ANALYSIS

Bottom Well #1, 20ft Water
Sampled 06/06/94 @ 1000
Submitted 06/07/94

	<u>mg/l (ppm)</u>	<u>Date Analyzed</u>
pH	7.6 s.u.	06/09/94
<u>Dissolved Metals</u>		
Arsenic	<0.005	06/10/94
Cadmium	<0.001	06/08/94
Copper	<0.01	06/08/94
Iron	<0.03	06/08/94
Lead	<0.01	06/09/94
Zinc	0.13	06/08/94

REVIEW	INITIAL	DATE
JUN 22 1994		
ENTERED	INITIAL	DATE



ENERGY LABORATORIES, INC.

P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489

LABORATORY REPORT

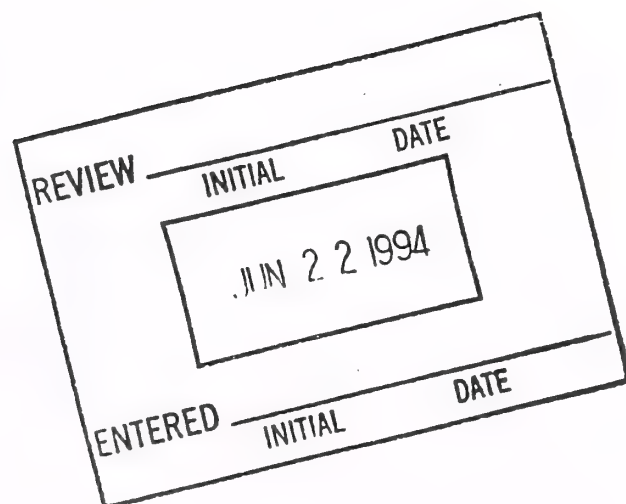
TO: Madison Mining
ADDRESS: Box 156
Virginia City, MT 59755

LAB NO.: 94-24243
DATE: 06/16/94 jmw

WATER ANALYSIS

Top Well #2, 45ft Water
Sampled 06/06/94 @ 1015
Submitted 06/07/94

	<u>mg/l (ppm)</u>	<u>Date Analyzed</u>
pH	7.6 s.u.	06/09/94
<u>Dissolved Metals</u>		
Arsenic	<0.005	06/10/94
Cadmium	<0.001	06/10/94
Copper	<0.01	06/08/94
Iron	<0.03	06/08/94
Lead	<0.01	06/08/94
Zinc	0.44	06/08/94



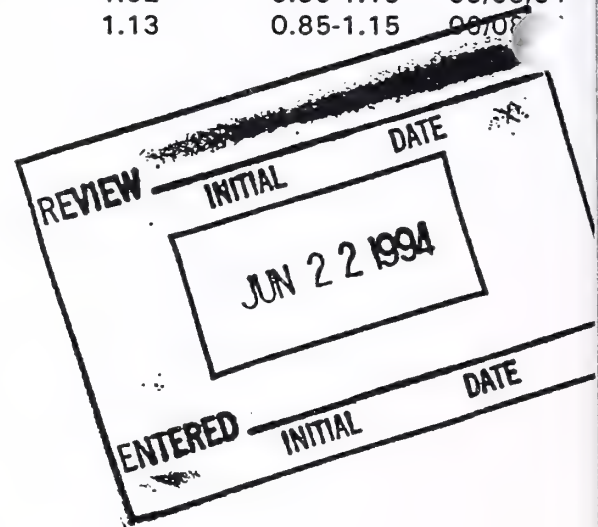
Lab Nos.

94-24242-3

QUALITY ASSURANCE DATA PACKAGE

This report includes the results of quality assurance tests performed with the sample analyses. They are performed to determine if the methodology is in control and to monitor the laboratory's ability to produce accurate and precise results.

<u>Constituent</u>	Duplicate Analysis		Spiked	Blank Analysis, <u>mg/l (ppm)</u>	-----Reference-----		Date Analyzed
	-----mg/l (ppm)-----		Analysis, %		Sample Analysis, <u>mg/l (ppm)</u>	Acceptance Range, <u>mg/l (ppm)</u>	
	<u>Original</u>	<u>Duplicate</u>	<u>Recovery</u>				
pH, s.u.	6.3	6.3	N/A	N/A	N/A	N/A	06/09/94
<u>Dissolved Metals</u>							
Arsenic	<0.005	<0.005	86	<0.005	0.022	0.019-0.030	06/10/94
Cadmium	<0.001	<0.001	92	<0.001	1.01	0.85-1.15	06/08/94
Copper	<0.01	<0.01	100	<0.01	1.04	0.85-1.15	06/08/94
Iron	<0.03	<0.03	107	<0.03	1.05	0.85-1.15	06/08/94
Lead	<0.01	<0.01	113	<0.01	1.02	0.85-1.15	06/08/94
Zinc	0.01	0.01	109	<0.01	1.13	0.85-1.15	06/08/94





ENERGY LABORATORIES, INC.

P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-777-189

LABORATORY REPORT

TO: Ron Lane
ADDRESS: Madison Mining Corp.
Box 74
Virginia City, MT 59755

LAB
DATE

4-29-94 to
told Ron to
remember to
Arsenic in
June

I have no idea what this submittal is
for. This does not appear to be a PWS.
J.C.

WATER ANALYSIS

Bottom Well #1, 20' Depth, 6' Below Gr. Level
Sampled 03/09/94 @ 1140
Submitted 03/10/94

<u>Constituent</u>		<u>Date Analyzed</u>
pH	7.9 s.u.	03/11/94
<u>Dissolved Metals</u>	<u>mg/l(ppm)</u>	
Cadmium	<0.001	03/21/94
Copper	0.01	03/21/94
Iron	1.02	03/21/94
Lead	<0.01	03/21/94
Zinc	0.08	03/21/94

REVIEW J.C. 4-27-94
INITIAL DATE
MAR 29 1994
ENTERED
INITIAL DATE

**ENERGY LABORATORIES, INC.**

P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4444

LABORATORY REPORT

TO: Ron Lane
ADDRESS: Madison Mining Corp.
Box 74
Virginia City, MT 59755

LAB NO.: 94-9990
DATE: 03/22/94 lm

WATER ANALYSIS

Top Well #2, 45' Depth, 22' Below Gr. Level
Sampled 03/09/94 @ 1110
Submitted 03/10/94

<u>Constituent</u>		<u>Date Analyzed</u>
pH	7.9 s.u.	03/11/94
<u>Dissolved Metals</u>	<u>mg/l(ppm)</u>	
Cadmium	<0.001	03/21/94
Copper	<0.01	03/21/94
Iron	0.04	03/21/94
Lead	<0.01	03/21/94
Zinc	0.27	03/21/94



ENERGY LABORATORIES, INC.

P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489

LABORATORY REPORT

TO: Ron Lane
ADDRESS: Madison Mining Corporation
P.O. Box 156
Virginia City, MT 59755

LAB NO.: 93-57183
DATE: 12/16/93 ds

WATER ANALYSIS

*Imbement
Drinking Water
Well*

TOP
~~Bottom~~ Well #2
45' Deep Standing Water
Submitted 12/07/93

Depth

RECEIVED

DEC 20 1993

MONT. DEPT. OF HEALTH & ENV. SCIENCES
WATER QUALITY BUREAU

<u>Constituent</u>		<u>Date Analyzed</u>
Specific Conductance @ 25° C	331 μ mhos/cm	12/08/93
pH	7.7 s.u.	12/08/93
<u>Total Metals</u>	<u>mg/l (ppm)</u>	<u>Date Analyzed</u>
Arsenic	<0.001	12/15/93
Cadmium	<0.001	12/14/93
Copper	<0.01	12/09/93
Iron	0.05	12/09/93
Lead	0.04	12/14/93
Zinc	0.26	12/09/93



ENERGY LABORATORIES, INC.

P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489

LABORATORY REPORT

TO: Ron Lane
ADDRESS: Madison Mining Corporation
P.O. Box 156
Virginia City, MT 59755

LAB NO.: 93-57182
DATE: 12/16/93 ds

RECEIVED

DEC 20 1993

WATER ANALYSIS

Impoundment well

Bottom Well #1
18' Deep Standing Water
Submitted 12/07/93

MONT. DEPT. OF HEALTH & ENV. SCIENCES
WATER QUALITY BUREAU

Constituent

Depth

Date Analyzed

Specific Conductance @ 25° C	341 μ mhos/cm	12/08/93
pH	7.6 s.u.	12/08/93
<u>Total Metals</u>	<u>mg/l (ppm)</u>	
Arsenic	0.001	12/15/93
Cadmium	<0.001	12/09/93
Copper	0.01	12/09/93
Iron	0.35	12/09/93
Lead	0.02	12/14/93
Zinc	0.04	12/09/93



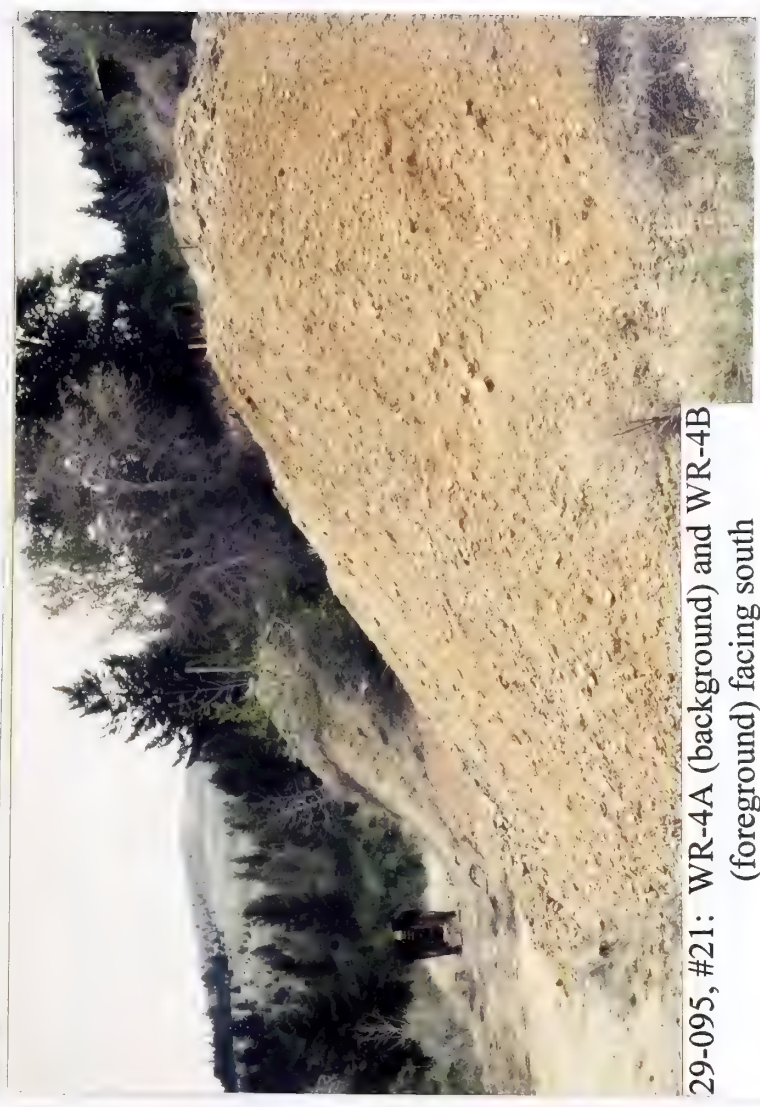
29-095, #18: WR-1 (left) and WR-2 (right) facing west



29-095, #19: WR-3 facing west



29-095, #20: Adit #4 (open) with discharge; AD-1 sample location



29-095, #21: WR-4A (background) and WR-4B (foreground) facing south



29-095, #22: TP-1 facing east from WR-4B



29-095, #23: South half of TP-1 and north half of TP-2 facing east from WR-4B



29-095, #24: South half of TP-2 facing east from WR-4B



29-095, #25: GW-1 and GW-2 sample location and TP-1 dam (background)



29-095, #26: Mill building (foreground) and WR-4B on right (background)

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: BELLE PA#: 29-098

Date: July 19 and 20, 1994 Time: 1600-1800/0915-1450

Field Team Leader: Flammang, Pioneer

Sampling Personnel: Clark, West; Pioneer

Visitors: None

Weather/Seasonality Observations: Sunny; hot (70°-90°F); slight breeze; very dry.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #8: WR-3 from base facing northwest; #9: Adit #4 (open); #10: Collapsing cabin (foreground), WR-5A (left background), and WR-5B (right background); #11: WR-1 and loadout facing north; #12: Facing south toward WR-2, water flowing from beaver pond (foreground) and flow coming from under WR-2 (right); #13: Mill, loadout, and buildings on hillside facing west. Video Tape No. 2

General Comments/Observations (not covered specifically in attached Inventory Forms): Though a mill building was present on-site, very few tailings were found. The literature indicates tailings were shipped off-site for processing in 1937; this may have been the fate of any other tailings the mill might have produced (Cultural Resource 24MA524 noted).

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: WR-2 should be removed or isolated from stream. WR-1 should be leveled, amended or coversoiled, and vegetated. Demolish hazardous structures and close open adit.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): BELLE PA#: 29-098

Legal Description: T 6S ; R 3W ; Sec. 35 , NE 1/4 SW 1/4 1/4

County: MADISON Mining District: VIRGINIA CITY

Latitude: N 45° 15' 8.6" Longitude: W 111° 56' 6.8"

Primary Drainage Basin and Code: Granite Creek/10020003

Secondary Drainage Basin: Alder Gulch

USGS Quadrangle map name(s): Virginia City

Mine Type/Commodities: Hardrock/Gold, Silver

Activity Status: Active , Inactive/Exploration , Abandoned X .

Ownership: Known Y N X ; private/public? Private

Owner, Agent, or Contact (Include address and phone when available): Unknown

Relationship to other mines/sites in the area/district: Unknown

Regulatory Status (Activity by other agencies)? Hardrock permits?
Past Reclamation Activities? N/A

General site features: Elevation 6000'-6240', Slope 20°,
Aspect East and Southeast

Land use: Mining X , Recreational X , Residential , Urban ,
Agricultural X , Other(Specify)

Area of disturbed/unvegetated lands? Approx. 4 acre(s) .

Site Dimensions: 350 feet x 150 feet; 450 feet x 200 feet; 150 feet x 50 feet

Predominant vegetation types: Aspen, willow, raspberries, roses, Engelmann spruce, juniper, Douglas fir, sage

Access: roads - good (paved) , poor (maintained dirt road) X ,
4wd , trail .

Other logistical considerations (proximity to other sites). Cross Alder Creek on foot at mill or walk up overgrown road from campsite 1/4 mile south of site; U.S. Grant mine is 1 mile north off of Alder Gulch Road.

Well logs within 1 mile radius; (Attach MBMG Well Log Printout(s): There are no wells reported within a mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). Site lies on east side of Alder Gulch and north side of unnamed tributary to Alder Gulch. Water in tributary flows southwest to confluence with Alder Gulch, which flows north away from the site. Alder Gulch meets Granite Creek approximately 5 miles northwest of the site. They flow west into the Ruby River 5 miles away. Rocks on-site were gneiss and a felsic intrusive.

Mining/milling history, ore type/tenor, host rock, gangue: Shipping records indicate that between 1903 and 1935 inclusive, 175 dry tons of ore were shipped, which produced 699.9 oz. gold and 1,224 oz. silver. In 1937, 71 dry tons of tailings were shipped producing 35.45 oz. gold and 179 oz. silver. Vein mineralization appears to be pyrite, chalcopyrite, and galena in a gangue of quartz. Chalcocite is present associated with the quartz on WR-2.

Mine Operation?

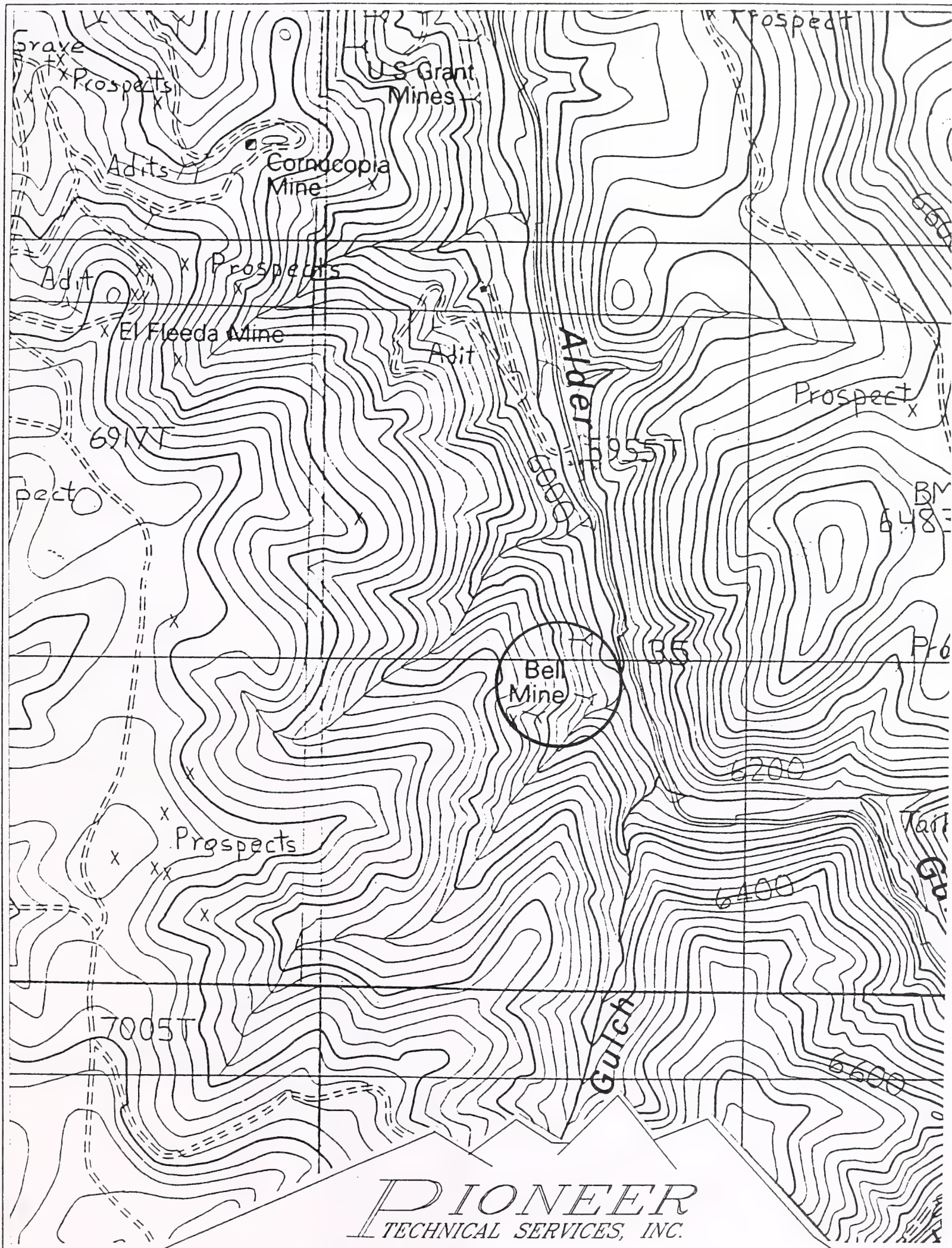
Shafts - Yes___, No X, # ___ , Comment___
Adits - Yes X, No___, # 7 , Comment 1 open; 6 collapsed
Pits - Yes___, No X, # ___ , Comment___
Placers - Yes___, No X, # ___ , Comment___
Other - Yes___, No X, # ___ , Comment___

Mill Operation? Yes X, No___ . If yes answer the next three questions:

Period(s) of Operation: Unknown

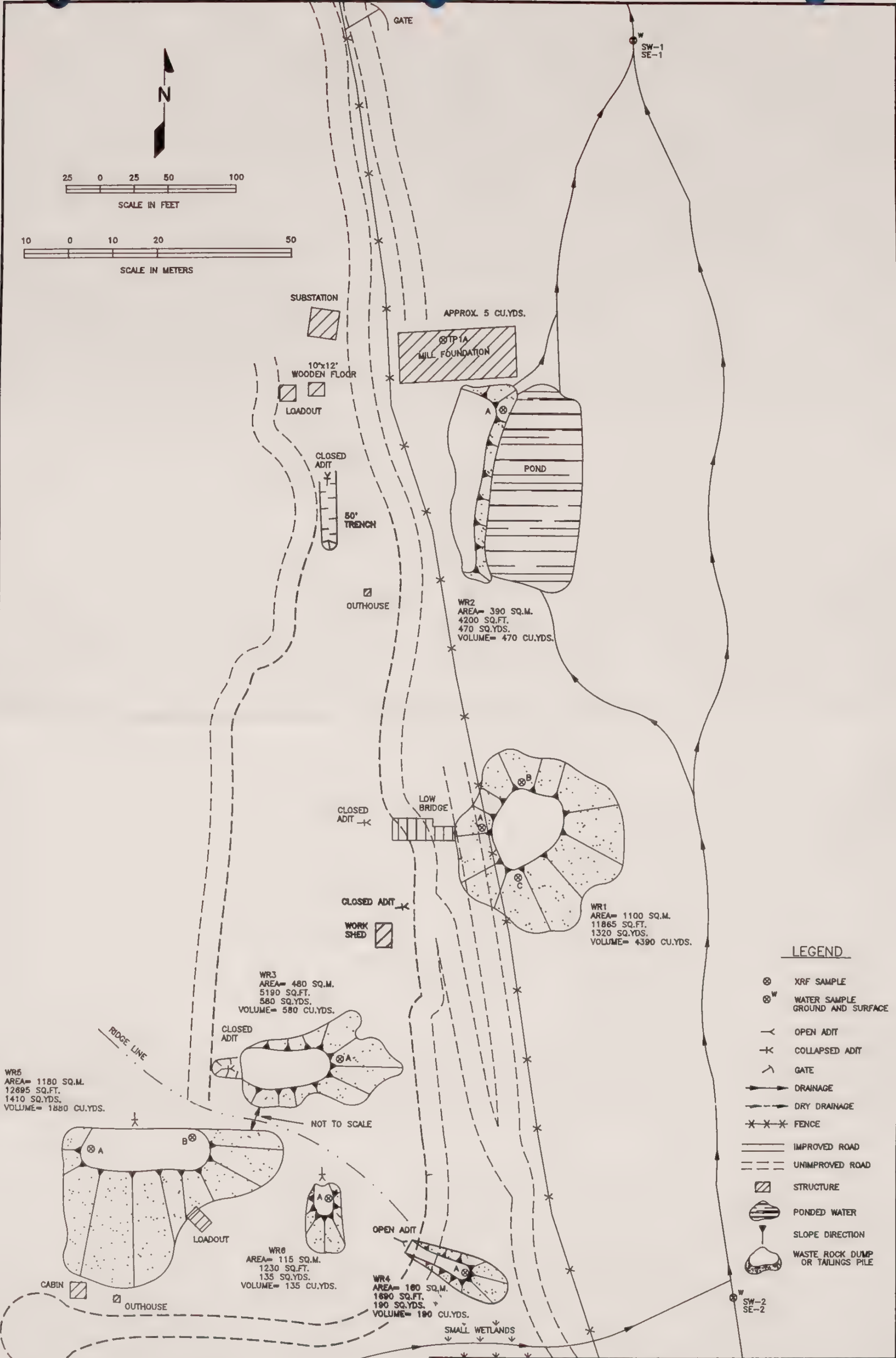
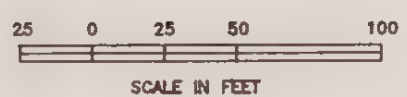
Origin of Ore Milled - Custom Mill___ Dedicated Mill___; Number and names of mines that supplied mill feed: Unknown

Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting?
Unknown



PIONEER
TECHNICAL SERVICES, INC.

BELLE, P.A. NO. 29-098
T06S, R03W, SECTION 35
SCALE: 1" = 1000'



LEGEND

- XRF SAMPLE
- WATER SAMPLE GROUND AND SURFACE
- OPEN ADIT
- COLLAPSED ADIT
- GATE
- DRAINAGE
- DRY DRAINAGE
- FENCE
- IMPROVED ROAD
- UNIMPROVED ROAD
- STRUCTURE
- PONDED WATER
- SLOPE DIRECTION
- WASTE ROCK DUMP OR TAILINGS PILE

DRAWN FOR:

PIONEER
TECHNICAL SERVICES, INC.

TITLE:

BELLE
PA# 29-098

DRAWING NO.: PT340251
DATE: 11/27/94

REV: -
PLOT SCALE: 1 = 20

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): 100% silt

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): 6" of tailings in two piles on mill building foundation (< 5 cubic yards).

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): Dry, hardpacked

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): None

Comments on potential for mitigation: None needed

SOURCE INVENTORY FORM

SAMPLERS: Flammang, Clark, West

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd ³)	LOCATION/DESCRIPTION	CONTAINMENT	pH SU (D/S)*	RADIO-ACTIVITY (mR/HR)	LAB. SAMPLE NO.	DATE/TIME	ANALYSES
TP-1A	TAIL	5	Grab sample on north end of lower mill foundation	None	6.0 (D)	0.035	N/A	N/A	XRF Analysis
WR-1A	WR	4,390	Largest pile under loadout bridge south of mill; west end, 10' from top	None	6.2 (D)	0.06	29-098-WR-1	07/20/94 1400	T-Metals, ABA
WR-1B	WR		North end, 2' from top	None	3.5 (D)	0.045			
WR-1C	WR		South end, 2' from top	None	4.4 (D)	0.04			
WR-2A	WR	470	East of mill; north end, on top, streamside	None	5.5 (D)	0.05	29-098-WR-2	07/20/94 1430	T-Metals, ABA
WR-3A	WR	580	Uppermost waste rock, west side of mine; approx. 10' down in center	None	5.2 (D)	0.04	N/A	N/A	XRF Analysis
WR-4A	WR	190*	Associated with open adit; approx. 2' down from top on southeast side	None	6.8 (D)	0.035	N/A	N/A	XRF Analysis
WR-5A	WR	1,880*	Southwest part of site on unnamed tributary; south end, second lobe north	None	6.8 (D)	0.05	29-098-WR-3	07/20/94 1415	T-Metals, ABA
WR-5B	WR		10' from top on third lobe from south in gray material	None	5.65 (D)	0.05			
WR-6A	WR	135*	North of WR-5; 10' from top in center of pile	None	6.4 (D)	0.045			
SS-1	SOIL	N/A	Background soil; 150' above road, on north side of road, 1,000' south of site	N/A	N/A	N/A	29-098-SS-1	07/20/94 1230	T-Metals

*Direct reading (Galaxy Meter); S-saturated Paste (Ozium Meter)

Comments or deviations from SOPs: 29-098-WR-1 is composite of WR-1A through -1C. 29-098-WR-2 is a grab of WR-2A. 29-098-WR-3 is composite of WR-5A, -5B, and -6A.
 *GPS reception failed, so volumes are roughly approximated.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes____, No X, Number:____ Identification:_____

Filled shafts: Yes____, No X, Number:____ Identification:_____

Seeps/Springs: Yes____, No X, Number:____ Identification:_____

Groundwater wells within 4 miles?: Yes X, No____;

Number of well logs: 23

Distance to nearest well used for drinking:

____<1,000 ft; ____1,000 ft to 0.5 miles; X>0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite____, Probable____, Possible X, Unlikely____.

Waste rock is uncontained and contains elevated metal concentrations.

WR-2 is probably near shallow alluvial aquifer.

Approximate Depth to Groundwater: X<25 ft; ____ 25 - 100 ft; ____ >100 ft.

Other observations/notes: N/A

SAMPLERS:

[illegible]

NOTE: Estimated (E) or Measured (M) from adit, shaft, seep or springs

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes X, No , Name(s): Unnamed tributary to Alder Gulch; Alder Gulch

Dry streambeds: Yes , No X, Name(s):

Other surface water: Yes X, No , Name(s)/Description: Beaver pond bounded on west side by WR-2.

Waste materials within any floodplain: Yes X, No Source ID(s): WR-2

Approximate Flood frequency? X 1 yr, 10 yr, 100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? 4.2 cfs
High Flow: 40 cfs, Average Flow: 4 cfs

Distance between waste source(s) and nearest surface water body (ft)? 0 feet; WR-2 bounded on west side by beaver pond. Alder Gulch flows around west side and possibly under WR-2.

Surface water draining onto or through waste sources: Yes X, No ,
Describe: Water exiting beaver pond appears to flow under WR-2.

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Irrigation, agriculture, wetlands, childrens' fishing ponds approximately 3 miles down in Alder Gulch.

Observed erosional/sedimentation/stream turbidity problems? Yes X, No . Distance downstream (ft)? 0-500 X; 500-1,000 ; >1,000 .
Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): Iron-staining on rocks in water coming from beaver pond and flowing next to WR-2. Rocks are stained in that braid of braided Alder Gulch until it joins with rest of braided Alder Gulch.

SURFACE WATER INVENTORY FORM

SAMPLERS: Flammang

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SAMPLE LOCATION	pH	SC μS/cm @ 25°C	Temp °C	ALK. mg/L as CaCO ₃	Flow cfs/gpm	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
SW-1	SW	Downstream in Alder Gulch, approx. 200' from north end of mill where Alder Gulch braided stream becomes one	6.49	370	23.1	139	4.3 cfs (E)	29-098-SW-1	07/20/94 1305	T-Metals, TDS, Hardness, Cl, SO ₄ , NO ₂ /NO ₃
SE-1	SE	Downstream in Alder Gulch, approx. 200' from north end of mill where Alder Gulch braided stream becomes one	N/A	N/A	N/A	N/A	N/A	29-098-SE-1	07/20/94 1305	T-Metals
SW-2	SW	Upstream of site and confluence of unnamed tributary with Alder Gulch; 50' above old road, bridge abutments	6.64	313	24.9	150	4.2 cfs (M)	29-098-SW-2	07/20/94 1220	T-Metals, TDS, Hardness, Cl, SO ₄ , NO ₂ /NO ₃
SE-2	SW	Upstream of site and confluence of unnamed tributary with Alder Gulch; 50' above old road, bridge abutments	N/A	N/A	N/A	N/A	N/A	29-098-SE-2	07/20/94 1220	T-Metals
SW-3	SW	Upgradient of WR-5, WR-6 in unnamed tributary, just above where road ends	6.35	232	22.2	97	15 gpm (E)	29-098-SW-3	07/20/94 1145	T-Metals, TDS, Hardness, Cl, SO ₄ , NO ₂ /NO ₃
SE-3	SE	Upgradient of WR-5, WR-6 in unnamed tributary, just above where road ends	N/A	N/A	N/A	N/A	N/A	29-098-SE-3	07/20/94 1145	T-Metals
SE-500	SE	Approx. 500' downstream of SW-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	XRF Analysis

FLOW: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO₃)
Presence of evaporative salt deposits? (ESD)
Discolored or turbid seepage? (SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?
Presence of ferric hydroxide precipitates? (FEOX)
Presence of burned or stressed vegetation? (VEG)
pH \leq 5.0 (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? 2 to 3 acres in Alder Gulch floodplain, otherwise steep

Wetlands present: Yes X, No , Describe: Streamside on unnamed tributary and Alder Gulch

Carbonate rocks/soils: Yes , No X, Describe:

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10 ; 10-30 ; 30-100 ; 100-300 X; 300-1,000 ; 1,000-3,000 ; 3,000-10,000 ; 10,000 or greater ; Comments

Nearest residence: <1,000 ft; X 1,000 ft - 0.5 miles; >0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Flammang, Clark, West

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LINES)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH/MODERATE/LOW/NONE)
WR-1	FE0X; SO3; pH	Dry	11,865	11,865	Yes	Low
WR-2	FE0X; SO3	Dry	4,200	2,100	Yes	Low
WR-3	None	Dry	5,190	3,890	Yes	None
WR-4	None	Dry	1,690*	420	Yes	None
WR-5	FE0X; SO3	Dry	12,695*	11,425	Yes	Low
WR-6	FE0X; SO3	Dry	1,230*	1,110	Yes	Low
TP-1	None	Dry	10	10	Yes	Low

Notes and Clarifications: *No GPS measurements, so areas are approximated.

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X,
Describe:_____

Population within 1 mile: 1-10 X; 10-30____; 30-100____; 100-300____;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____.

Evidence of recreational use on site: Yes X, No____, Describe: Lower
site lies just off of popular and well used Alder Gulch Road; many
tourists and motorbike riders on road during investigation. Campfire
ring was found at cabin near WR-5.

Accessibility (check each that apply): X Easily accessible - no fences,
gates, or warning signs;____ Moderately Accessible - barbed wire fences,
road gated, or signs posted;____ Difficult Access - chain-link fence,
road gated and locked, site guarded (does not include locked or manned
access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment_____
Wilderness Area - Yes____, No X, Comment_____
T&E Species Habitat - Yes____, No X, Comment_____
Bat Habitat - Yes X, No____, Comment Possible, open adit

Primary Drainage____; Secondary Drainage X; No Information____:

Riparian Habitat Quality - High____, Medium____, Low Not Rated

Wetlands Frontage - High____, Medium____, Low Not Rated

Fisheries Habitat and Species Classification - 4

Sport Fishery Classification - 4

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes X, No____, Number 1, types and locations:____
Adit #4

Hazardous structures: Yes X, No____, Number 6, types and locations:____
Cabin below WR-5; loadout and track at WR-1; shed on hillside uphill
from WR-1; loadout above mill; loadout at mill; mill.

Unstable highwalls, pits, trenches, slopes: Yes____, No X, Number____,
types and locations:_____

Unstable waste piles, impoundments, undercut banks: Yes X, No____,
Number 2, types and locations: WR-1 and WR-5 are steep, unvegetated,
and at angle of repose.

Fire and/or Explosion hazards: Yes____, No X, Explain:_____

Bibliography

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0, Prepared by Montana Natural Resource Information System, December 1989.

MDSL/AMRB Files, A Summary of Information and Analysis of Future Responsibilities, including correspondence and assays package, Written by William R. Callaway, March 1938.

MDSL/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for Belle Mine, Prepared by Northern Engineering and Testing, August 12, 1987.

USBM, Gold Lode Mining in the Tobacco Root Mountains, Madison County, Montana, Information Circular 6972, Written by S.H. Lorain, November 1937.

USGS, Mining Districts of the Dillon Quadrangle, Montana, and Adjacent Areas, Bulletin 574, Written by Alexander N. Winchell, 1914.

USGS, Topographic Map, Virginia City, Montana, 7 1/2 minute Quadrangle, 1988.

LABORATORY ANALYTICAL DATA

**BELLE
PA NO. 29-098**

Belle Mine PA# 29-098
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - FLAMMANG
INVESTIGATION DATE: 07/20/94

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	Ag (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
29-098-SE1	1.0 U	7.7 U	45.4	0.9 U	5.6	22.4 JX	12.7 JX	11300	0.05 J	147	17.7 JX	17.2	11.8 UJ	39.1 JX	NR
29-098-SE2	0.8 U	6.2 U	76.8	0.7 U	6.5	36.4 JX	14.6 JX	11400	0.10 J	174	23.7 JX	8.17 U	9.5 UJ	40.5 JX	NR
29-098-SE3	0.9 U	6.9 U	135	0.8 U	9.1	37.8 JX	13.7 JX	21900	0.06 J	549	22.6 JX	10.6	10.7 UJ	39.5 JX	NR
29-098-WR1	2.0	26.6	167	1.1	34.1	86.1	170	35300	0.76 J	713	83.5	313	10.3 UJ	367	NR
29-098-WR2	80.5	24.8	895	8.1	8.1	10.4	1870	26100	1.31 J	679	11.9	1040	8.7 UJ	991	NR
29-098-WR3	3.0	19.4	210	2.8	26.2	64.9 JX	194 JX	33300	0.24 J	945	64.5 JX	607	8.8 UJ	377 JX	NR
BACKGROUND	0.8 U	9.2 B	210	0.7 U	8.6	37.1 JX	19.5 JX	19700	0.06 J	678	24.6 JX	14.8	9.0 UJ	101 JX	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL			SULFUR			SULFATE			PYRITIC			ORGANIC			PYRITIC			SULFUR		
	SULFUR	ACID BASE	%	ACID BASE	POTENT.	%	SULFUR	ACID BASE	POTENT.	SULFUR	ACID BASE	POTENT.	SULFUR	ACID BASE	POTENT.	SULFUR	ACID BASE	POTENT.	SULFUR	ACID BASE	POTENT.
29-098-WR1	0.10	3.12	30.4	27.3	17.4	15.2	<0.01	0.10	<0.01	0.02	0.03	<0.01	0.09	0.12	0.02	0.62	0.94	0.00	29.8	24.3	15.5
29-098-WR2	0.25	7.81	25.2	17.4	15.2	15.2	<0.01	0.10	<0.01	0.03	0.03	<0.01	0.12	0.02	0.02	0.94	0.00	0.00	24.3	15.5	15.5
29-098-WR3	0.01	0.31	15.5	15.2	15.2	15.2	<0.01	0.10	<0.01	0.03	0.03	<0.01	0.12	0.02	0.02	0.94	0.00	0.00	24.3	15.5	15.5

WATER MATRIX ANALYSES

Metals in Water
Results in ug/L

FIELD ID	Ag	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
29-098-SW1	0.12 U	1.1 U	66.2	4.0 U	8.4 U	6.8 U	7.8	188	0.10	9.6	14.4 U	1.0	51.6 U	15.6 U	157
29-098-SW2	0.12 U	1.1 U	70.0	4.0 U	8.4 U	6.8 U	5.9 U	12.5	0.11	3.7	14.4 U	1.3	51.6 U	15.6 U	171
29-098-SW3	0.12 U	1.1 U	60.9	4.0 U	8.4 U	6.8 U	5.9 U	639	0.12	18.5	14.4 U	1.3	51.6 U	16.6	107

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Wet Chemistry
Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
29-098-SW1	192	<5	11	0.06	NR
29-098-SW2	188	<5	10	0.06	NR
29-098-SW3	264	<5	7	0.61	NR

LEGEND

- SE1 - Downgradient in Alder Gulch, approx. 200' from north end of mill.
 SE2 - Upgradient of tie and confluence of unnamed trib. with Alder Gulch.
 SE3 - Upgradient of WR5, WR6 in unnamed trib., just above where road ends.
 WR1 - Composite of subsamples WR1A through 1C.
 WR2 - Grab sample of the WR2A subsample.
 WR3 - Composite of subsamples WR3A, 3B, and 6A.
 BACKGROUND - From the Belle Mine (29-098-SS1).
- SW1 - Same as sample 29-098-SE1.
 SW2 - Same as sample 29-098-SE2.
 SW3 - Same as sample 29-098-SE3.

XRF ANALYSIS RESULTS

**BELLE
PA NO. 29-098**

Mine Name: Belle PA# 29-098
XRF Field Analyses
Results in PPM

XRF SAMPLE I.D.	CrHI	K	Ca	Ti	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Sr
29-098-SE500		22904.6	31094.8	4482.44		1312.29 *	56292.5			124.302 *	102.13 *	102.47 *	139.294
29-098-TP1A		36762.2	6617.5	507.834 *			23120.2			382.131	404.916		95.9258
29-098-TP1A-DUP		36975.8	6230.13	481.588 *			23027.4			339.224	423.556		87.9155
29-098-WR1A		33880.4	5984.52	1043.39		2167.6 *	36961.8			334.938 *	391.495		162.429
29-098-WR1B		27498.7	10946.6	3790.01		693.776 *	47381.3			174.086 *	390.171	125.186 *	60.4455
29-098-WR1C		19342.3	16708.3	3407.96		1503.33 *	62670.8			193.576 *	306.927	98.2925 *	76.6152
29-098-WR1-COMP		30139.3	17774.7	4047.46		1953.2 *	60492.4			194.858 *	404.145	95.3383 *	89.2921
29-098-WR2A		27808.4	12173.6	1270.84		1270.92 *	38130.3			1929.91	1035.84		162.121
29-098-WR3A		35176.9	9039.77	4368.41		1799.91 *	59000.5			174.102 *	357.264	99.6396 *	45.2063 *
29-098-WR3-COMP		65608.7	10151	3208.26		2696.57	65077.2			204.822 *	649.133		127.191
29-098-WR4A		29724.1	10979.4	2904.85		1864.35 *	46484.3			121.709 *		92.447 *	85.2046
29-098-WR5A		31604.8	7024.59	1999.51		2162.63 *	53209.4			422.902	572.44		86.3711
29-098-WR5B		45367.5	9677.87	4986.81		1476.77 *	51452.6			152.255 *	262.4 *	117.121 *	31.9536 *
29-098-WR6A		65224.1	8528.31	3127.35		2628 *	64231			225.717 *	623.379		167.396

XRF SAMPLE I.D.	Zr	Hg	Mo	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th
29-098-SE500	344.146		12.8392 *		80.0831 *						15.0922 *	
29-098-TP1A	141.567		25.462 *	1079.72	93.6587							
29-098-TP1A-DUP	147.364		29.5658	1104.66	105.193							
29-098-WR1A	171.202		39.7702	408.741	118.599							17.9364 *
29-098-WR1B	148.655		7.73303 *	41.6919 *	151.397						19.272 *	
29-098-WR1C	162.162		9.5744 *	52.7511 *	135.758							
29-098-WR1-COMP	187.153		19.5606 *	147.959 *	156.977							11.8055 *
29-098-WR2A	166.554		46.4007	780.615	101.831					132.782 *		17.9746 *
29-098-WR3A	124.357		12.575 *		172.019			59.4773 *				
29-098-WR3-COMP	170.562		28.4362 *	477.861	183.468							
29-098-WR4A	92.074				118.904							
29-098-WR5A	165.408		45.5297	683.363	104.353							
29-098-WR5B	202.261				238.358							
29-098-WR6A	151.713		28.2579 *	368.623	190.301							

* = Estimated Quantity

\$ = Unvalidated Data

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**BELLE
PA NO. 29-098**

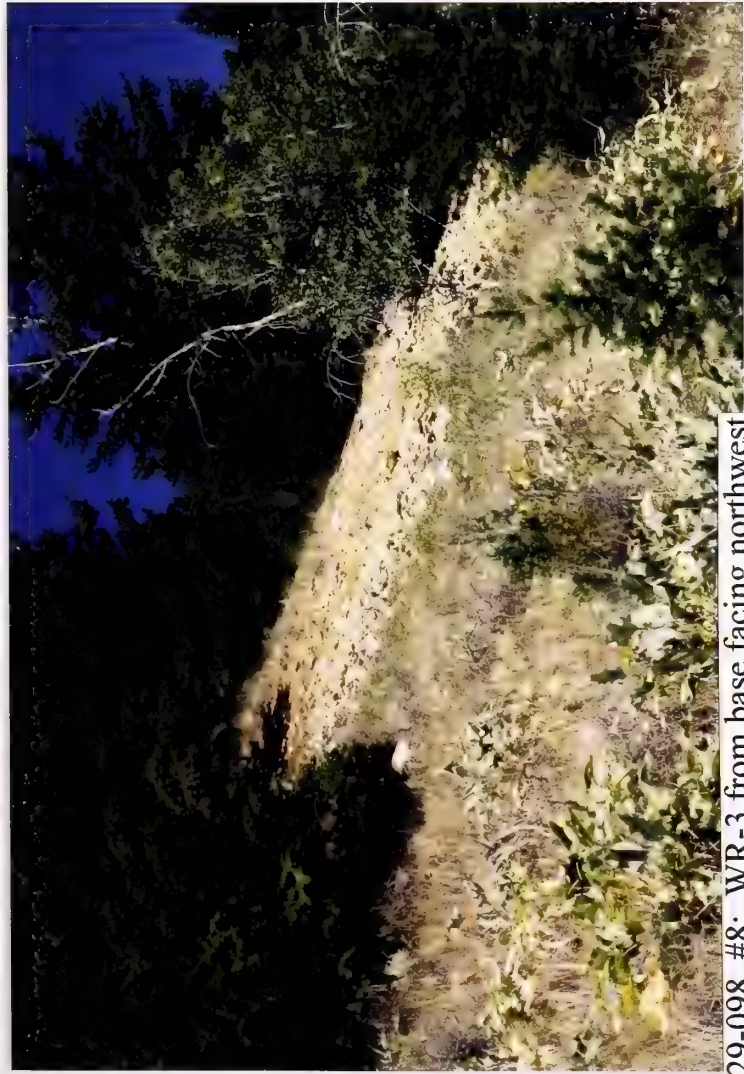
AIMSS SCORESHEET

SITE NAME:
PA NUMBER:

Belle Mine
29-098

LINE NO.		GROUNDWATER PATHWAY	
1		OBSERVED RELEASE	0
2		EXCEEDENCES	0
3A	GW - LIKELIHOOD OF RELEASE	CONTAINMENT	20
3B		GW DEPTH	20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B 400
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C 400
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 2.257
6	GW - TARGETS	WELLS - 1 MI. x 2.5	0.0
7		WELLS - 1 TO 4 MI	23
8		NEAREST WELL	0
9		TARGETS SCORE	LINES 6 + 7 + 8 23.0
10		GROUNDWATER SCORE	LINES 4 x 5 x 9 20764
SURFACE WATER PATHWAY			
11		OBSERVED RELEASE	0
12		EXCEEDENCES	0
13A	SW - LIKELIHOOD OF RELEASE	CONTAINMENT	20
13B		DISTANCE TO SW	20
13C		POTENTIAL TO RELEASE	LINES 13A x 13B 400
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C 400
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 2.720
16	SW - TARGETS	DRINKING WATER POP'N	0
17		IMPACTED DRAINAGE	1
18		WETLANDS	10
19		FISHERY	1
20		RECREATION	5
21		IRRIGATION/STOCK	2
22		T & E SPECIES HABITAT	0
23		TARGETS SCORE	SUM LINES 16 THRU 22 19
24		SURFACE WATER SCORE	LINES 14 x 15 x 23 20672
AIR PATHWAY			
25		OBSERVED RELEASE	0
26A	AIR - LIKELIHOOD OF RELEASE	CONTAINMENT	5
26B		DISTANCE TO POPULATION	10
26C		POTENTIAL TO RELEASE	LINES 26A x 26B 50
27		LIKELIHOOD SCORE	LINES 25 + 26C 50
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 0.140
29	AIR - TARGETS	POPULATION - 4 MILES	100
30		NEAREST RESIDENCE	5
31		WETLANDS	0
32		PARKS / WILDERNESS	0
33		T & E SPECIES HABITAT	0
34		TARGETS SCORE	SUM LINES 29 THRU 33 105
35		AIR PATHWAY SCORE	LINES 27 x 28 x 34 735
DIRECT CONTACT PATHWAY			
36		OBSERVED EXPOSURE	50
37A	LIKELIHOOD OF EXPOSURE	ACCESSIBILITY	20
37B		DISTANCE TO POPULATION	10
37C		POTENTIAL EXPOSURE	LINES 37A x 37B 200
38		LIKELIHOOD SCORE	LINES 36 + 37C 250
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 0.118
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE	1
41		NEAREST RESIDENCE	5
42		RECREATIONAL USE	10
43		TARGETS SCORE	SUM LINES 40 THRU 42 16
44		DIRECT CONTACT SCORE	LINES 38 x 39 x 43 472
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE (LINES 10 + 24 + 35 + 44) / 100,000		0.43

LINE NO.			SITE NAME:	Belle Mine
			PA NUMBER:	29-098
	<u>SITE SAFETY</u>			
1	THREAT	ACCESSIBILITY		20
2	HAZARDS	OPEN SHAFTS	100 EA.	0
3		OPEN ADITS	50 EA.	50
4		UNSTAB. HIWALLS / PITS	75 EA.	0
5		HAZ. STRUCTURES	40 EA.	240
6		EXPLOSIVES		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 THRU 7	290
9	TARGETS	POPULATION - 1 MILE		1
10		NEAREST RESIDENCE		5
11		RECREATIONAL USE		10
12		TARGETS SCORE	SUM LINES 9 THRU 11	16
13		SITE SAFETY SCORE	(LINES 1 x 8 x 12) / 1,000	92.80



29-098, #8: WR-3 from base facing northwest



29-098, #9: Adit #4 (open)



29-098, #10: Collapsing cabin (foreground), WR-5A (left background), and WR-5B (right background)



29-098, #11: WR-1 and loadout facing north



29-098, #12: Facing south at WR-2; water flowing from beaver pond (foreground) and flow coming from under WR-2 (right)



29-098, #13: Mill, loadout, and buildings on hillside facing west

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: PROSPECT MINE/MILLSITE PA#: 29-136

Date: July 19, 1994 Time: 0830-1420

Field Team Leader: Flammang, Pioneer

Sampling Personnel: Clark, West; Pioneer

Visitors: Driller, Driller's Assistant, Geologist

Weather/Seasonality Observations: Sunny; hot (70°-90°F); breeze;
very dry.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #1: WR-2 on top
(active area) facing south; #3: Reclaimed area from bottom (auger
rig on top); #4: WR-1, reprocessing equipment, and mill building
facing northwest; #5: SE-2 sample location (foreground), settling
pond wall (mid-ground), and new tailings pond dam (background)
facing southwest; #6: TP-1 from TP-1 breached dam facing south; #7:
TP-2 from just below TP-2 breached dam facing southeast.
Video Tape No. 2

General Comments/Observations (not covered specifically in attached Inventory Forms): The entire mine site has been bulldozed; active ore delineation
work taking place. Auger rig and trenching occurring on top of
hill. Sites on hillside were bulldozed about two years ago;
revegetation occurring naturally. Dump near mill foundations is
being reprocessed. Waste rock and few tailings leveled for roads.
No structures, adits, shafts, or equipment remain on-site. The
stope reported by Northern in 1987 inventory has a cement cover.
A new mill complex has been built approximately 1/4 mile up creek.
A new tailings pond has been installed in drainage above old
tailings; 3 small settling/overflow ponds and monitoring well just
above old tailings. No stakes were used during this investigation
to mark sample locations due to active dirt moving (Cultural
Resource 24MA1199 noted).

Other Hazardous Materials/Substances Present: 10 - 55 gal. barrels full of unknown clear liquid; 1 barrel has white powder on top, 1 barrel containing an unknown powder on side and is corroding; label on 1 barrel reads, "OGY04648, CR1 Carbon SAEWRE, 2/12/89, Net 551.250 lbs."

General Comments on Potential Remedial Alternatives: Mine area is not being actively explored or reprocessed; it has been reclaimed. Either stabilize tailings banks, route run-on around tailings, and vegetate small areas that are unvegetated or move tailings out of valley, cover, and revegetate. Identify contents of barrels and either dispose of properly or store in an appropriate location.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): PROSPECT PA#: 29-136

Legal Description: T 6S ; R 3W ; Sec. 21 , SE 1/4 SE 1/4 1/4
T 6S ; R 3W ; Sec. 27 , NW 1/4 NW 1/4 1/4

County: MADISON Mining District: VIRGINIA CITY
Latitude: N 45° 17' 30" Longitude: W 111° 57' 45"

Primary Drainage Basin and Code: Granite Creek/10020003
Secondary Drainage Basin: Alder Gulch
USGS Quadrangle map name(s): Virginia City

Mine Type/Commodities: Hardrock, Millsite/Gold, Silver, Lead, Zinc, Copper

Activity Status: Active X (mine), Inactive/Exploration,
Abandoned X (tails).

Ownership: Known Y N X ; private/public? Private
Owner, Agent, or Contact (Include address and phone when available): Unknown

Relationship to other mines/sites in the area/district: In 1887, site was operated by same company as the Alameda mine. Exploration is on-going at site with hopes to link Prospect, Cyanide, Excelsior (owned by same group), and Alameda (in negotiations) by an adit.

Regulatory Status (Activity by other agencies)? Hardrock permits?
Past Reclamation Activities? All waste rock and features on southeast hillside have been leveled (2 years ago) with natural vegetation occurring. Features on hilltop are mostly flattened and filled in except deep stope, which has cement cap (recently constructed). All features on main level except mill foundation are gone; WR-1 being reprocessed.

General site features: Elevation 5900'-6200', Slope 20° (upper); 10° (tails), Aspect Southeast, northeast (mine); North (tails)

Land use: Mining X, Recreational, Residential, Urban, Agricultural X, Other(Specify)

Area of disturbed/unvegetated lands? 16.5 acre(s).

Site Dimensions: 550 feet x 950 feet (WR-1 & TP-1); 1,000 feet x 200 feet (WR-2)

Predominant vegetation types: Sage brush, bunch grass, willows

Access: roads - good (paved), poor (maintained dirt road) X, 4wd, trail

Other logistical considerations (proximity to other sites). Near Alameda, Cyanide and Excelsior mines

Well logs within 1 mile radius; (Attach MBMG Well Log Printout(s): There are 8
wells reported within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also
note presence of radioactive minerals). Site lies in and on west side of unnamed
dry drainage to Alder Gulch. In some literature, drainage has been
identified as Barton Gulch. Water leaving the site would flow
north to confluence with Alder Gulch 1/2 mile away. Alder Gulch
flows northwest and meets Granite Creek approximately 3 miles away;
it continues to flow northwest to confluence with Ruby River 5
miles downstream. Site appeared to be underlain by basalt, gneiss,
and jasper.

Mining/milling history, ore type/tenor, host rock, gangue: First
ore shipment was in 1898; mine reopened in 1931 and operated
through 1940. Present day exploration occurring, concentrating on
gold in jaspers. Vein mineralization with ore minerals of galena,
chalcopryrite, and pyrite in quartz gangue, some gold occurring in
jasper and secondary sulfides, particularly chalcocite.

Mine Operation?

Shafts - Yes___, No X, # ___ , Comment___
Adits - Yes___, No X, # ___ , Comment___
Pits - Yes___, No X, # ___ , Comment___
Placers - Yes___, No X, # ___ , Comment___
Other - Yes X, No___, # ___ , Comment Stope, cement-covered

Mill Operation? Yes X, No___ . If yes answer the next three
questions:

Period(s) of Operation: 1892 to 1913; 1932 to 1940

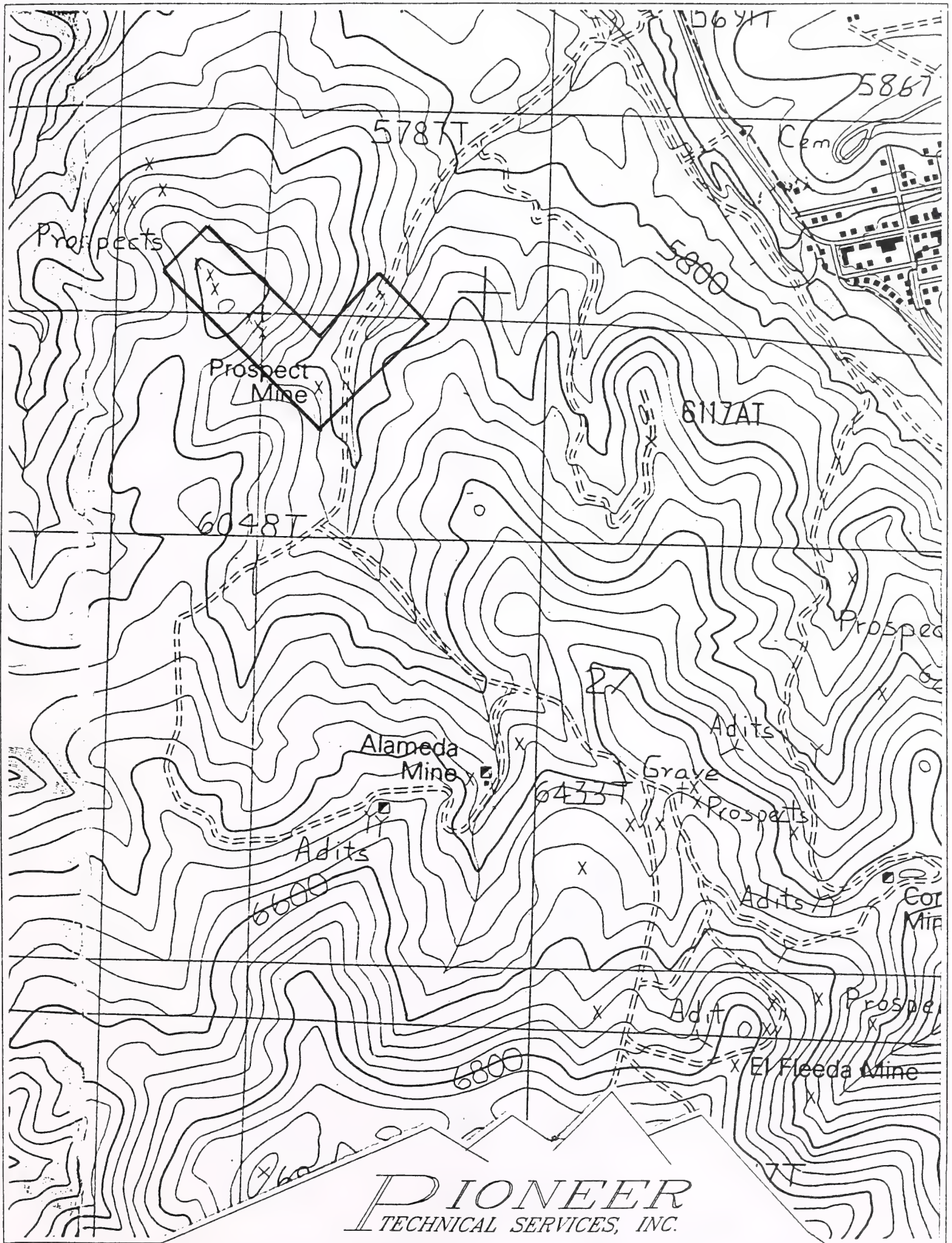
Origin of Ore Milled - Custom Mill___ Dedicated Mill___; Number and
names of mines that supplied mill feed: Unknown

Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting?
1892 - small, 10-stamp cyanide plant; 1932 - 60-ton floatation/
amalgamation mill

Montana Bureau of Mines and Geology
Water Well Log Data

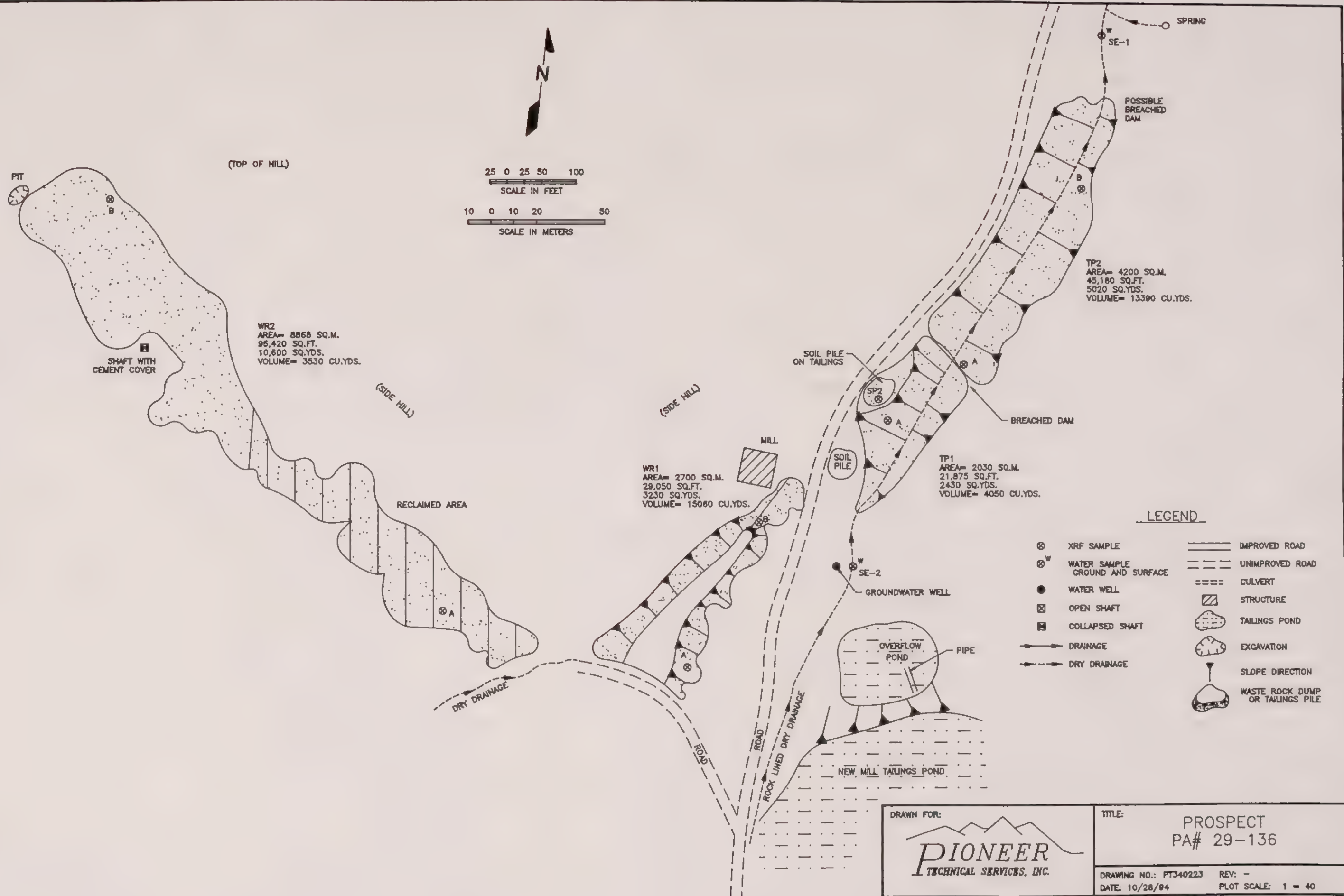
08/12/1994

Well No.	Location	Depth	Yield	Static Water Level
108803	06S 03W 22 AB	294.0	7.5	18.00
M:108804	06S 03W 22 ACDB	170.0	0.0	29.00
M:139168	06S 03W 22 B	128.0	28.0	20.00
M:108805	06S 03W 23 C	91.0	3.0	55.00
M:108806	06S 03W 23 DBB	20.0	10.0	2.00
M:108808	06S 03W 27	0.0	0.0	0.00
M:108807	06S 03W 27	0.0	0.0	0.00
M:138743	06S 03W 27 BC	195.0	25.0	80.00



PIONEER
TECHNICAL SERVICES, INC.

PROSPECT, P.A. NO. 29-136
T06S, R03W, SECTION 27
SCALE: 1" = 1000'



DRAWN FOR: PIONEER TECHNICAL SERVICES, INC.	TITLE: PROSPECT PA# 29-136
	DRAWING NO.: PT340223 REV: - DATE: 10/28/84 PLOT SCALE: 1 = 40

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): TP-1 appears to be 95% fine-grained sand and 5% clay. TP-2 is approximately 75% fine-grained sand and 25% clay.

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): TP-1 has mostly clay in top 8 feet; depth approximately 18 feet. Upper TP-2 has clay zones in upper 7 feet; depth was 20 feet. Lower TP-2 has clay in lower 5 feet of tailings; depth 15 feet deep.

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): Dry

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): None; possible breached dams

Comments on potential for mitigation: Tailings revegetated naturally where flat; cliff forming in stream cut. Pull from drainage, grade, amend, and revegetate; or dispose of in a properly constructed repository.

SOURCE INVENTORY FORM

SAMPLERS: Flammang, Clark, West

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd ³)	LOCATION/DESCRIPTION	CONTAINMENT	PH SU (D/S)	RADIO-ACTIVITY (mR/HR)	LAB. SAMPLE NO.	DATE/TIME	ANALYSES
WR-1A	WR	15,060	South end of WR-1; off upper road	None	6.4 (D)	0.05	29-136-WR-1	07/19/94 1750	T-Metals, ABA
WR-1B	WR		North end of WR-1; main road level, 5' up in rock being reprocessed	None	6.2 (D)	0.05			
WR-2A	WR	3,530	Northeast corner of bulldozed material on top of hill	None	6.2 (D)	0.05			
WR-2B	WR		Near middle of reclaimed area, approx. 150' up from drainage	None	6.0 (D)	0.04			
SP-2	WR	ND	Stockpiles of soil on TP-2; north pile, west side of south face, near bottom	None	6.0 (D)	0.04	N/A	N/A	XRF Analysis
TP-1A-1	TAIL	4,050	West stream side approx. 100' up from breached TP-1 dam, profile; 0-8', tan fine-grained sand with small clay layers	Breached Dam	6.0 (D)	0.045	29-136-TP-1	07/19/94 1740	T-Metals, ABA, Cyanide
TP-1A-2	TAIL		8-17.25', light tan sand	Breached Dam	6.1 (D)	0.05			
TP-2A-1	TAIL	13,390	North face of TP-1 breached dam, profile; 0-7', alternating thin layers of orange to tan/brown fine-grained sand/clay	Breached Dam	5.6 (D)	0.03	29-136-TP-2	07/19/94 1750	T-Metals, ABA, Cyanide
TP-2A-2	TAIL		7-22', medium orange to tan fine-grained sand	Breached Dam	5.8 (D)	0.05			
TP-2B-1	TAIL		Approx. 75' upgradient of breached TP-2 dam, east side of creek, profile; 0-10', light brown sand	Breached Dam	6.0 (D)	0.04			
TP-2B-2	TAIL		10-15', clayey light brown sand	Breached Dam	4.2 (D)	0.04			
TP-2B-3	SOIL		15-20', underlying soil, appears to be dark brown silt with no pebbles	N/A	6.1 (D)	0.035	N/A	N/A	XRF Analysis

D-Direct Reading (Railway Meter); S-Saturated Paste (Orion Meter)

Comments or deviations from SOPs: 29-136-WR-1 is composite of WR-1A, -1B, -2A, and -2B. 29-136-TP-1 is composite of TP-1A-1 and -1A-2. 29-136-TP-2 is composite of TP-2A-1, -2A-2, -2B-1 and -2B-2. See Belle Mine (29-098) for background soil sample. ND = Not Determined

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes____, No X, Number:____ Identification:_____

Filled shafts: Yes____, No X, Number:____ Identification:_____

Seeps/Springs: Yes____, No X, Number:____ Identification:_____

Groundwater wells within 4 miles?: Yes X, No____;

Number of well logs: 28

Distance to nearest well used for drinking:

____<1,000 ft; X 1,000 ft to 0.5 miles; ____>0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite____, Probable____, Possible X, Unlikely____.

Tailings in drainage with elevated metal values are a large, uncontained source.

Approximate Depth to Groundwater: X <25 ft; ____ 25 - 100 ft; ____ >100 ft.

Other observations/notes: Spring on hillside has water which enters drainage in which tailings lie about 25 feet below the TP-2 breached dam; water only flows a short distance before disappearing.

SAMPLERS:

[illegible]

FLOW: Estimated (E) or Measured (M) from edit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes____, No X, Name(s): _____

Dry streambeds: Yes X, No____, Name(s): On topographic map, unnamed tributary to Alder Gulch; on Cultural Resource sheets Amendment, identified as Barton Gulch.

Other surface water: Yes X, No____, Name(s)/Description: Newly constructed settling/overflow ponds approx. 50 feet upgradient of TP-1; water presently being pumped from these uphill to aid in drilling.

Waste materials within any floodplain: Yes X, No____ Source ID(s): TP-1 and TP-2 are cut by dry drainage.

Approximate Flood frequency? X 1 yr, ____ 10 yr, ____ 100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? 0

High Flow: 0.5 cfs, Average Flow: Dry

Distance between waste source(s) and nearest surface water body (ft)? 2,000 feet to Alder Gulch; settling/overflow ponds contained water during investigation, approx. 50 feet from south end of TP-1; 50 feet of road berms near the settling ponds made up of WR-1, water may be 75 feet from them.

Surface water draining onto or through waste sources: Yes____, No X, Describe: Run-off, precipitation only

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?) Recreational; fishery; childrens' fishing ponds just southeast of confluence of Barton Gulch with Alder Gulch; Virginia City tourist area approximately 1 mile downgradient of mine; irrigation; agriculture; wetlands.

Observed erosional/sedimentation/stream turbidity problems? Yes X, No____. Distance downstream (ft)? 0-500____; 500-1,000____; >1,000 X. Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): Tailings make up majority of stream sediments for at least 1,200 feet. Below breached dam for TP-2, tailings up to 8" deep in stream cut.

SAMPLERS: Clark

Flow: Estimated (E) or Measured (M):

MDSL AMRB/PIONEER 5/16/94

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO₃)
Presence of evaporative salt deposits? (ESD)
Discolored or turbid seepage? (SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?
Presence of ferric hydroxide precipitates? (FEOX)
Presence of burned or stressed vegetation? (VEG)
pH ≤ 5.0 (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? None, except where tailings are presently located; approximately 1/2 acre total.

Wetlands present: Yes____, No X, Describe: None present until confluence with Alder Gulch.

Carbonate rocks/soils: Yes____, No X, Describe:_____

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10____; 10-30____; 30-100____; 100-300 X; 300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____; Comments_____

Nearest residence: ____ <1,000 ft; X 1,000 ft - 0.5 miles; ____ >0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:

observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Flammang, Clark, West

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH/MODERATE/LOW/NONE)
WR-1	FE0X; SO3	Dry	29,050	29,050	Yes	None
WR-2	FE0X	Dry	95,420	71,565	Yes	None
TP-1	None	Dry	21,875	4,375	Yes	Low
TP-2	pH	Dry	45,180	4,520	Yes	Low

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes X, No _____,
Describe: Presently re-working WR-1 and SP-2; augering, trenching,
sampling WR-2A

Population within 1 mile: 1-10____; 10-30____; 30-100____; 100-300 X;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____;
Comments Town of Virginia City in close proximity.

Evidence of recreational use on site: Yes____, No X, Describe:_____

Accessibility (check each that apply): X Easily accessible - no fences,
gates, or warning signs;____ Moderately Accessible - barbed wire fences,
road gated, or signs posted;____ Difficult Access - chain-link fence,
road gated and locked, site guarded (does not include locked or manned
access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment_____
Wilderness Area - Yes____, No X, Comment_____
T&E Species Habitat - Yes____, No X, Comment_____
Bat Habitat - Yes____, No X, Comment_____

Primary Drainage____; Secondary Drainage____; No Information X :

Riparian Habitat Quality - High____, Medium____, Low____

Wetlands Frontage - High____, Medium____, Low____

Fisheries Habitat and Species Classification - _____

Sport Fishery Classification - _____

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes____, No X, Number____, types and locations:_____

Hazardous structures: Yes____, No X, Number____, types and locations:____
6 to 7 feet drop from remaining cement walls on mill structure

Unstable highwalls, pits, trenches, slopes: Yes____, No X, Number____,
types and locations:_____

Unstable waste piles, impoundments, undercut banks: Yes X, No____,
Number 5, types and locations: Both sides of creek in TP-1 and TP-2,
top 7 to 12 feet of tailings are cliff-forming and undercut. East face
of WR-1 where reprocessing is occurring is undercut to 90°.

Fire and/or Explosion hazards: Yes X, No____, Explain: Possible;
unknowns in barrels may be fire hazards.

Bibliography

- MBMG, Mineral and Industry File 90.0, Prospect Mine, Madison County, Montana.
- MBMG, Well Log Database, July 14, 1994.
- MDFWP, Montana Rivers Information System Rivers Report, Version 2.0, Prepared by Montana Natural Resource Information System, December 1989.
- MDSL/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for Prospect, Prepared by Northern Engineering and Testing, August 26, 1987.
- MDSL/AMRB Files, Montana Cultural Resource Inventory Form and Amendment for Prospect Mine, Prepared by Dames & Moore, September 21, 1989 and December 6, 1990.
- USGS, Topographic Map, Virginia City, Montana, 7 1/2 minute Quadrangle, 1988.

LABORATORY ANALYTICAL DATA

**PROSPECT
PA NO. 29-136**

Prospect PA# 29-136
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - FLAMMANG
INVESTIGATION DATE: 07/19/94

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	Ag (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
29-136-SE1	5.8	19.2	823	0.8	4.7	20.4	47.3	12300	0.27 J	267	16.1	315	9.0 UJ	79.2	NR
29-136-SE2	0.6 U	7.5	92.2	0.6 U	7.0	23.2	12.9	10200	0.07 J	217	17.8	10.8	7.7 UJ	28.9	NR
29-136-TP1	4.5	50.0	2950	0.7 U	3.6	36.7	76.4	20800	0.77 J	200	22.3	467	8.8 UJ	81.6	0.563
29-136-TP2	6.0	59.6	3250	0.9 U	3.9	40.6	80.1	20700	0.73 J	197	24.6	698	11.1 UJ	146	0.699
29-136-WR1	0.8 U	38.4	108	0.7 U	14.6	79.2	38.5	27200	0.12 J	216	59.7	147	9.6 UJ	80.4	NR
BACKGROUND	0.8 U	9.2	210	0.7 U	8.6	37.1 JX	19.5 JX	19700	0.06 J	678	24.6 JX	14.8	9.0 UJ	101 JX	NR

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Reported

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	TOTAL SULFUR ACID BASE t/1000t	NEUTRAL POTENT. t/1000t	SULFUR ACID BASE POTENT. t/1000t	SULFATE SULFUR %	PYRITIC SULFUR %	ORGANIC SULFUR %	PYRITIC SULFUR ACID BASE t/1000t	SULFUR ACID BASE POTENT. t/1000t
29-136-TP1	0.07	2.19	10.6	8.38	0.07	<0.01	<0.01	0.00	10.6
29-136-WR1	0.01	0.31	18.9	18.6	0.01	<0.01	<0.01	0.00	18.9

LEGEND

SE1 - Downgradient of breached TP2 dam approx. 50'.
SE2 - Approx. 15' downgradient of monitoring well.
TP1 - Composite of subsamples TP1A-1 and 1A-2.
TP2 - Composite of subsamples TP2A-1, 2A-2, 2B-1, and 2B-2.
BACKGROUND - From the Belle Meade (29-114-SS1).

XRF ANALYSIS RESULTS

**PROSPECT
PA NO. 29-136**

Mine Name: Prospect PA# 29-136
XRF Field Analyses
Results in PPM

XRF SAMPLE I.D.	CrHI	K	Ca	Ti	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Sr
29-136-SE1000		25015.6	10955	1939.39			26302				142.71 *	59.318 *	114.099
29-136-SE500		27060.8	9424.02	1441.92		716.428 *	27572.6				160.934 *	59.5608 *	117.817
29-136-SP2		18720.7	4484.73	417.347 *			35394				154.064 *	169.885 *	80.6996
29-136-TP1A1		29574.5	3481.49	746.652 *		487.234 *	35923.3	634.641 *			170.102 *	181.673 *	123.76
29-136-TP1A2		26440.2	3509.75	332.426 *		473.963 *	29564.3				147.284 *	122.45 *	99.9237
29-136-TP1-COMP		25368.6	3671.36	478.083 *			34922				170.139 *	111.631 *	116.978
29-136-TP2A1		12456.8	3331.17			451.496 *	27420.9				152.677 *		128.344
29-136-TP2A2		25030.9	4297.63	282.778 *			23145.3				158.013 *	111.652 *	93.51
29-136-TP2B1		34655.1	2623.19	893.655			34920.7				142.63 *	140.938 *	78.6955
29-136-TP2B2		29792.8	5070.73	825.345 *		626.83 *	41685				366.904	90.8259 *	105.223
29-136-TP2B3		20116.5	16719	3318.98		1077.09 *	45052.2				177.457 *	77.5567 *	139.764
29-136-TP2-COMP		27891.4	4134.61	583.414 *			29605				175.29 *	97.6887 *	97.6837
29-136-WR1A		35649.7	4402.55	1985.27			85327.3			176.711 *	268.893 *	294.167	43.8691 *
29-136-WR1B		19081.1	12035.2	2382.97			58490				190.294 *	177.785 *	75.1899
29-136-WR1-COMP		25775.5	15021.9	3024.87		900.233 *	64781.2				209.646 *	202.572 *	102.889
29-136-WR2A		47766.2	7641.53	2284.92			73009.7				238.579 *	277.6 *	133.679
29-136-WR2B		13286.8	23556.5	4586.5		662.581 *	64066.4				176.436 *	176.021 *	116.037

XRF SAMPLE I.D.	Zr	Hg	Mo	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th
29-136-SE1000	371.167		17.7498 *	105.162 *	73.0355				965.333			
29-136-SE500	187.396			129.216 *	84.3054			57.3753 *	978.911			
29-136-SP2	180.953			265.688	87.6761			63.4872 *	947.003			
29-136-TP1A1	155.061		9.47912 *	322.142	80.5255			87.55 *	2279.76			
29-136-TP1A2	136.044			334.202	56.8758 *			62.1298 *	2177.59			
29-136-TP1-COMP	132.77		11.4292 *	377.822	79.0593			53.9504 *	2219.71			
29-136-TP2A1	82.1412			795.227	37.3296 *			128.753 *	4316.29			
29-136-TP2A2	128.644		9.93619 *	319.078	58.5698 *				2044.69			
29-136-TP2B1	206.298		11.5846 *	128.224 *	93.9101				786.724			
29-136-TP2B2	133.138			404.639	99.8948				1893.12			
29-136-TP2B3	346.559		11.8966 *		93.8449			56.5047 *	693.125			
29-136-TP2-COMP	145.92		7.55932 *	443.027	71.9888			59.3399 *	2431.99			
29-136-WR1A	159.766			81.2294 *	210.59				341.734			15.8644 *
29-136-WR1B	232.909				112.567				410.704			
29-136-WR1-COMP	268.369		11.0377 *		138.194				391.483			
29-136-WR2A	289.775		11.0244 *	204.122	189.661				257.649			
29-136-WR2B	295.615				87.7341				400.473			

* = Estimated Quantity

\$ = Unvalidated Data

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**PROSPECT
PA NO. 29-136**

AIMSS SCORESHEET

SITE NAME:
PA NUMBER:

Prospect
29-136

LINE NO.				
GROUNDWATER PATHWAY				
1		OBSERVED RELEASE		0
2		EXCEEDENCES		0
3A	GW - LIKELIHOOD OF RELEASE	CONTAINMENT		20
3B		GW DEPTH		20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B	400
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C	400
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	49.547
6	GW - TARGETS	WELLS - 1 MI. x 2.5		20.0
7		WELLS - 1 TO 4 MI		20
8		NEAREST WELL		5
9		TARGETS SCORE	LINES 6 + 7 + 8	45.0
10		GROUNDWATER SCORE	LINES 4 x 5 x 9	891846
SURFACE WATER PATHWAY				
11	SW - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		300
12		EXCEEDENCES		0
13A		CONTAINMENT		20
13B		DISTANCE TO SW		20
13C		POTENTIAL TO RELEASE	LINES 13A x 13B	400
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C	700
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	51.131
16	SW - TARGETS	DRINKING WATER POP'N		0
17		IMPACTED DRAINAGE		1
18		WETLANDS		10
19		FISHERY		1
20		RECREATION		5
21		IRRIGATION/STOCK		2
22		T & E SPECIES HABITAT		0
23		TARGETS SCORE	SUM LINES 16 THRU 22	19
24		SURFACE WATER SCORE	LINES 14 x 15 x 23	680042
AIR PATHWAY				
25	AIR - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		200
26A		CONTAINMENT		5
26B		DISTANCE TO POPULATION		10
26C		POTENTIAL TO RELEASE	LINES 26A x 26B	50
27		LIKELIHOOD SCORE	LINES 25 + 26C	250
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.339
29	AIR - TARGETS	POPULATION - 4 MILES		100
30		NEAREST RESIDENCE		5
31		WETLANDS		0
32		PARKS / WILDERNESS		0
33		T & E SPECIES HABITAT		0
34		TARGETS SCORE	SUM LINES 29 THRU 33	105
35		AIR PATHWAY SCORE	LINES 27 x 28 x 34	8899
DIRECT CONTACT PATHWAY				
36	LIKELIHOOD OF EXPOSURE	OBSERVED EXPOSURE		200
37A		ACCESSIBILITY		20
37B		DISTANCE TO POPULATION		10
37C		POTENTIAL EXPOSURE	LINES 37A x 37B	200
38		LIKELIHOOD SCORE	LINES 36 + 37C	400
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.275
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE		100
41		NEAREST RESIDENCE		5
42		RECREATIONAL USE		0
43		TARGETS SCORE	SUM LINES 40 THRU 42	105
44		DIRECT CONTACT SCORE	LINES 38 x 39 x 43	11550
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE (LINES 10 + 24 + 35 + 44) / 100,000			15.92

LINE NO.	SITE SAFETY			SITE NAME: PA NUMBER:	Prospect 29-136
	THREAT	ACCESSIBILITY			
1					20
2		OPEN SHAFTS	100 EA.		0
3		OPEN ADITS	50 EA.		0
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.		375
5		HAZ. STRUCTURES	40 EA.		0
6		EXPLOSIVES			100
7		HAZ. MATERIALS			50
8		HAZARDS SCORE	SUM LINES 2 THRU 7		525
9		POPULATION - 1 MILE			100
10	TARGETS	NEAREST RESIDENCE			5
11		RECREATIONAL USE			0
12		TARGETS SCORE	SUM LINES 9 THRU 11		105
13		SITE SAFETY SCORE	(LINES 1 x 8 x 12) / 1,000		1102.50



29-136, #1: Top of WR-2 (active area) facing south



29-136, #3: Reclaimed area, from bottom, auger rig on top



29-136, #4: WR-1, reprocessing equipment, and mill building facing northwest



29-136, #5: SE-2 sample location (foreground), settling pond wall (mid-ground), and new tailings pond dam (background) facing southwest



29-136, #6: TP-1 from TP-1 breached dam facing south



29-136, #7: TP-2 from below TP-2 breached dam facing southeast

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: GOLD CHROME PA#: 31-037

Date: August 15, 1994 Time: 1200-1400

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Bisch, West; Pioneer

Visitors: None

Weather/Seasonality Observations: Clear; sunny; hot; slight breeze; hot, dry summer.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #22: Collapsed adit and foundation; #23: AD-1 sample location at pond; #24: Foundation and two shafts; #25: Tailings in roadcut, TP-1A sample location. Video Tape No. 3

General Comments/Observations (not covered specifically in attached Inventory Forms): Mill and tailings not previously inventoried; tailings have been reclaimed; no waste rock observed to be present (may also have been reclaimed).

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Tailings are mostly reclaimed (covered and vegetated), except in later roadcut. Adit discharge has good water quality, but may seep into tailings; redirect around tailings.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): GOLD CHROME PA#: 31-037

Legal Description: T 18N ; R 30W ; Sec. 2 , SW 1/4 NE 1/4 1/4

County: MINERAL Mining District: ST. REGIS

Latitude: N 47° 20' 45" Longitude: W 115° 22' 40"

Primary Drainage Basin and Code: St. Regis River/17010204

Secondary Drainage Basin: Deer Creek

USGS Quadrangle map name(s): McGee Peak and DeBorgia South

Mine Type/Commodities: Hardrock/Unknown

Activity Status: Active , Inactive/Exploration X , Abandoned X .

Ownership: Known Y N X ; private/public? Public

Owner, Agent, or Contact (Include address and phone when available): Appears to be on USFS land

Relationship to other mines/sites in the area/district: Unknown

Regulatory Status (Activity by other agencies)? Hardrock permits?
Past Reclamation Activities? Tailings have been reclaimed in the past.

General site features: Elevation 3400' , Slope 0-30° ,
Aspect South

Land use: Mining , Recreational X , Residential , Urban ,
Agricultural , Other (Specify)

Area of disturbed/unvegetated lands? 0.25 acre(s) .

Site Dimensions: 100 feet x 100 feet

Predominant vegetation types: Western cedar, Engelmann spruce,
Mountain maple, alder, knapweed, fir

Access: roads - good (paved) , poor (maintained dirt road) X ,
4wd , trail .

Other logistical considerations (proximity to other sites). Deer
Creek Road to Forest Service campground; 1/4 mile from Up Up Creek
Road.

Well logs within 1 mile radius; (Attach MEMG Well Log Printout(s): There are no wells reported within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). Site lies in 100-year floodplain of Deer Creek, which flows north adjacent to the site. Deer Creek flows 3 miles to confluence with St. Regis River. The site appears to be underlain by limestones of Precambrian age.

Mining/milling history, ore type/tenor, host rock, gangue: No information available.

Mine Operation?

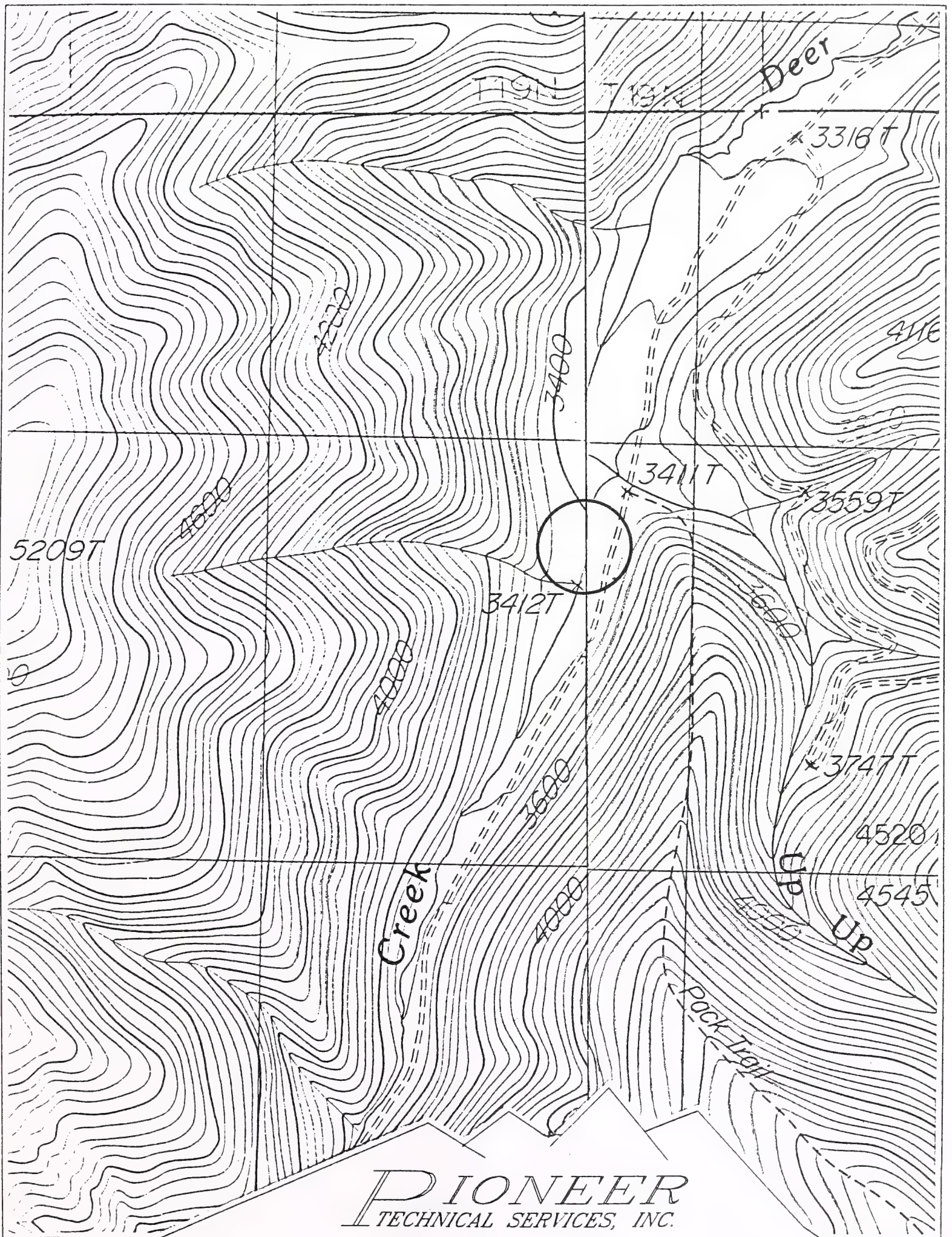
Shafts - Yes X, No , # 2, Comment Collapsed
Adits - Yes X, No , # 1, Comment Discharge during wetter part of the year
Pits - Yes , No X, # , Comment
Placers - Yes , No X, # , Comment
Other - Yes , No X, # , Comment

Mill Operation? Yes X, No . If yes answer the next three questions:

Period(s) of Operation: Unknown

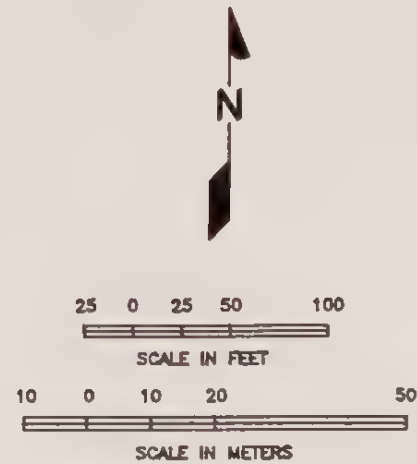
Origin of Ore Milled - Custom Mill Dedicated Mill X; Number and names of mines that supplied mill feed: Unknown (local)

Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting?
Unknown

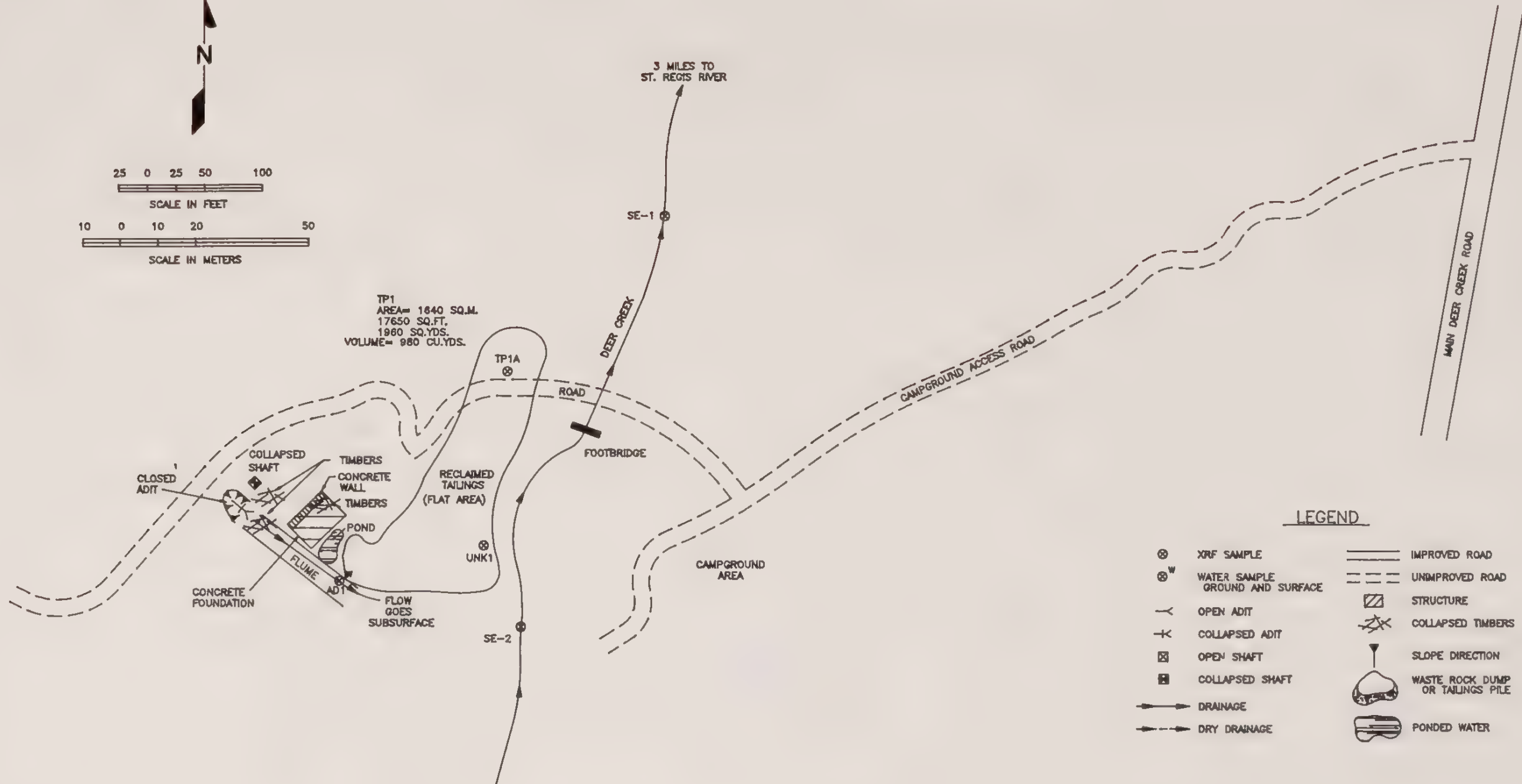


PIONEER
TECHNICAL SERVICES, INC.

GOLD CHROME, P.A. NO. 31-037
T18N, R30W, SECTION 02
SCALE: 1" = 1000'



TP1
AREA= 1640 SQ.M.
17650 SQ.FT.
1980 SQ.YDS.
VOLUME= 980 CU.YDS.



LEGEND

- | | | | |
|----------------|---------------------------------|-------|----------------------------------|
| ⊗ | XRF SAMPLE | == | IMPROVED ROAD |
| ⊗ ^w | WATER SAMPLE GROUND AND SURFACE | - - - | UNIMPROVED ROAD |
| — | OPEN ADIT | ▣ | STRUCTURE |
| —X— | COLLAPSED ADIT | ⌵ | COLLAPSED TIMBERS |
| ⊠ | OPEN SHAFT | ▲ | SLOPE DIRECTION |
| ⊠ | COLLAPSED SHAFT | ⬢ | WASTE ROCK DUMP OR TAILINGS PILE |
| → | DRAINAGE | ⬢ | PONDED WATER |
| → | DRY DRAINAGE | | |

DRAWN FOR:

PIONEER
TECHNICAL SERVICES, INC.

TITLE:

GOLD CHROME
PA# 31-037

DRAWING NO.: PT340240
DATE: 11/18/94

REV: -
PLOT SCALE: 1 = 30

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay):
Very fine-grained sand/silt

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): Depth up to 3 feet (in road cut); covered with 6" to 1' of topsoil and revegetated

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): Dry

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): Breach where road cuts through dam on south side.

Comments on potential for mitigation: Already reclaimed.

SOURCE INVENTORY FORM

SAMPLERS: Tuesday

[illegible]

b-Direct reading (Kelway Meter) : S-Saturated Paste (Orion Meter)

Comments or deviations from SOPs: 31-037-TP-1 is grab of TP-1A. See Saltese Consolidate (31-021) for background soil sample (1993 inventory data).

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes X, No , Number: 1 Identification: AD-1, not flowing (stagnant during this investigation)

Filled shafts: Yes , No X, Number: Identification:

Seeps/Springs: Yes , No X, Number: Identification:

Groundwater wells within 4 miles?: Yes X, No ;

Number of well logs: 77

Distance to nearest well used for drinking:

 <1,000 ft; 1,000 ft to 0.5 miles; X >0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW); Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter), temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite , Probable , Possible , Unlikely X.

Precipitation through cover and tailings, but tailings do not have elevated metals concentrations.

Approximate Depth to Groundwater: X <25 ft; 25 - 100 ft; >100 ft.

Other observations/notes: N/A

SAMPLERS: West

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): Adit water not flowing - standing water near collapsed adit. NM = Not Measured.

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes ☒, No ☐, Name(s): Deer Creek

Dry streambeds: Yes ☐, No ☒, Name(s): _____

Other surface water: Yes ☒, No ☐, Name(s)/Description: Adit discharge pond

Waste materials within any floodplain: Yes ☒, No ☐ Source ID(s): TP-1

Approximate Flood frequency? ☐ 1 yr, ☐ 10 yr, ☒ 100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? 4.9 cfs
High Flow: 50 cfs, Average Flow: 5 cfs

Distance between waste source(s) and nearest surface water body (ft)? 40 feet from TP-1 to Deer Creek

Surface water draining onto or through waste sources: Yes ☐, No ☒,
Describe: _____

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Wetlands and fishery on Deer Creek and St. Regis River.

Observed erosional/sedimentation/stream turbidity problems? Yes ☐, No ☒. Distance downstream (ft)? 0-500 ☐; 500-1,000 ☐; >1,000 ☐.
Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): _____

SAMPLERS: Tuesday, Bisch

Δ(Κ) περιεχόμενο (2) περίπτωση: 2072

Comments or Deviations from the SOPs (Pioneer SAP, 1993): Did not collect surface water from Deer Creek due to significant flow in the creek and no signs of erosion from site.

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO₃)
Presence of evaporative salt deposits? (ESD)
Discolored or turbid seepage? (SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?
Presence of ferric hydroxide precipitates? (FEOX)
Presence of burned or stressed vegetation? (VEG)
pH ≤ 5.0 (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? 1 acre on reclaimed tailings

Wetlands present: Yes X, No , Describe: Along Deer Creek

Carbonate rocks/soils: Yes X, No , Describe: Local rocks are carbonates.

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10 ; 10-30 ; 30-100 X;
100-300 ; 300-1,000 ; 1,000-3,000 ; 3,000-10,000 ; 10,000 or
greater ; Comments

Nearest residence: <1,000 ft; 1,000 ft - 0.5 miles; X >0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Tuesday, West

[illegible]

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X.
Describe:_____

Population within 1 mile: 1-10____; 10-30____; 30-100____; 100-300____;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____;
Comments None

Evidence of recreational use on site: Yes X, No____, Describe: Trails;
across creek from campground.

Accessibility (check each that apply): X Easily accessible - no fences,
gates, or warning signs;____ Moderately Accessible - barbed wire fences,
road gated, or signs posted;____ Difficult Access - chain-link fence,
road gated and locked, site guarded (does not include locked or manned
access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks -	Yes____, No <u>X</u> , Comment_____
Wilderness Area -	Yes____, No <u>X</u> , Comment_____
T&E Species Habitat -	Yes____, No <u>X</u> , Comment_____
Bat Habitat -	Yes____, No <u>X</u> , Comment_____

Primary Drainage____; Secondary Drainage X; No Information____:

Riparian Habitat Quality - High____, Medium X, Low____

Wetlands Frontage - High____, Medium X, Low____

Fisheries Habitat and Species Classification - 3

Sport Fishery Classification - 3

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes____, No X, Number____, types and locations:_____

Hazardous structures: Yes____, No X, Number____, types and locations:_____

Unstable highwalls, pits, trenches, slopes: Yes____, No X, Number____,
types and locations:_____

Unstable waste piles, impoundments, undercut banks: Yes____, No X,
Number____, types and locations:_____

Fire and/or Explosion hazards: Yes____, No X, Explain:_____

Bibliography

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0,
Prepared by Montana Natural Resource Information System, December
1989.

MDSL/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for
Gold Chrome, Prepared by Northern Engineering and Testing, June 24,
1988.

USGS, Topographic Maps, McGee Peak and DeBorgia South, Montana/Idaho, 7
1/2 minute Quadrangles, 1988.

LABORATORY ANALYTICAL DATA

**GOLD CHROME
PA NO. 31-037**

Gold Chrome PA# 31-037
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - TUESDAY
INVESTIGATION DATE: 08/15/94

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	Ag (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
31-037-SE1	0.8 U	6.5 U	33.6	0.8 U	1.6 U	1.7	3.0	7000	0.09	164 J	5.3	8.6 U	10.0 U	19.2	NR
31-037-SE2	0.7 U	5.3 U	35.8	0.6 U	1.6	1.5	3.7	5660	0.08	175 J	4.8	7.0 U	8.2 U	18.7	NR
31-037-TP1	0.8 U	6.6 U	216	0.8 U	3.7	1.7	16.2	7610	0.14	135 J	7.6	8.7 U	10.1 U	18.8	<0.288
BACKGROUND	NR	4.52 U	241	0.5 U	6.09	4.83	16.2 J	12500	0.047 J	1020	9.02	22.2 J	5.89 U	59.3	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	ACID BASE v/1000t	NEUTRAL POTENT v/1000t	SULFUR ACID BASE POTENT v/1000t	ORGANIC SULFUR %	PYRITIC SULFUR %	ACID BASE POTENT v/1000t	SULFUR ACID BASE POTENT v/1000t
31-037-TP1	<0.01	0.00	0.62	0.62	<0.01	<0.01	0.00	-0.62

WATER MATRIX ANALYSES

Metals in Water
Results in ug/L

FIELD ID	Ag	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
31-037-AD1	0.12 U	1.2	48.5	4.0 UX	10.1	6.8 U	5.9 U	95.4	0.20	2.3 U	14.4 U	2.0	51.6 U	15.6 U	14.1

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Wet Chemistry
Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
31-037-AD1	28	<5	<5	<0.05	NR

LEGEND

SE1 - Downstream Deer Creek, 100' off road cut.
SE2 - Upstream Deer Creek.
TP1 - Composite of subsample TP1A.
BACKGROUND - From the Subsite Consolidate Mine (31-021-SS1) (1993 Data).

AD1 - Add discharge at north end of site.

XRF ANALYSIS RESULTS

**GOLD CHROME
PA NO. 31-037**

Mine Name: Gold Chrome PA# 31-037
XRF Field Analyses
Results in PPM

XRF SAMPLE I.D.	CrHl	K	Ca	Tl	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Sr
31-037-TP1A		18653.9	14133.9	2677		666.611 *	18670.8			101.217 *	65.741 *	56.6586 *	351.05
31-037-UNK1		21719.4	15831.3	2977.81		455.526 *	19669.8			76.84 *	93.5449 *	50.4796 *	360.504
XRF SAMPLE I.D.	Zr	Hg	Mo	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th	
31-037-TP1A	264.651				58.2951 *				336.721			12.8214 *	
31-037-UNK1	298.078				69.7341				386.315				

* = Estimated Quantity

\$ = Unvalidated Data

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**GOLD CHROME
PA NO. 31-037**

AIMSS SCORESHEET

SITE NAME:
PA NUMBER:

Gold Chrome
31-037

LINE NO.		GROUNDWATER PATHWAY	
1		OBSERVED RELEASE	0
2		EXCEEDENCES	0
3A	GW - LIKELIHOOD OF RELEASE	CONTAINMENT	20
3B		GW DEPTH	20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B 400
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C 400
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 0.002
6	GW - TARGETS	WELLS - 1 MI. x 2.5	0.0
7		WELLS - 1 TO 4 MI	77
8		NEAREST WELL	0
9		TARGETS SCORE	LINES 6 + 7 + 8 77.0
10		GROUNDWATER SCORE	LINES 4 x 5 x 9 62
SURFACE WATER PATHWAY			
11		OBSERVED RELEASE	0
12	SW - LIKELIHOOD OF RELEASE	EXCEEDENCES	0
13A		CONTAINMENT	20
13B		DISTANCE TO SW	10
13C		POTENTIAL TO RELEASE	LINES 13A x 13B 200
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C 200
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 0.002
16	SW - TARGETS	DRINKING WATER POP'N	0
17		IMPACTED DRAINAGE	0
18		WETLANDS	10
19		FISHERY	5
20		RECREATION	5
21		IRRIGATION/STOCK	2
22		T & E SPECIES HABITAT	0
23		TARGETS SCORE	SUM LINES 16 THRU 22 22
24		SURFACE WATER SCORE	LINES 14 x 15 x 23 9
AIR PATHWAY			
25		OBSERVED RELEASE	0
26A	AIR - LIKELIHOOD OF RELEASE	CONTAINMENT	5
26B		DISTANCE TO POPULATION	5
26C		POTENTIAL TO RELEASE	LINES 26A x 26B 25
27		LIKELIHOOD SCORE	LINES 25 + 26C 25
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 0.000
29	AIR - TARGETS	POPULATION - 4 MILES	30
30		NEAREST RESIDENCE	0
31		WETLANDS	10
32		PARKS / WILDERNESS	0
33		T & E SPECIES HABITAT	0
34		TARGETS SCORE	SUM LINES 29 THRU 33 40
35		AIR PATHWAY SCORE	LINES 27 x 28 x 34 0
DIRECT CONTACT PATHWAY			
36		OBSERVED EXPOSURE	0
37A	LIKELIHOOD OF EXPOSURE	ACCESSIBILITY	20
37B		DISTANCE TO POPULATION	5
37C		POTENTIAL EXPOSURE	LINES 37A x 37B 100
38		LIKELIHOOD SCORE	LINES 36 + 37C 100
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 0.000
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE	0
41		NEAREST RESIDENCE	0
42		RECREATIONAL USE	5
43		TARGETS SCORE	SUM LINES 40 THRU 42 5
44		DIRECT CONTACT SCORE	LINES 38 x 39 x 43 0
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE (LINES 10 + 24 + 35 + 44) / 100,000		0.00

SITE NAME:
PA NUMBER:

Gold Chrome
31-037

LINE
NO.

SITE SAFETY

1	THREAT	ACCESSIBILITY		20
2		OPEN SHAFTS	100 EA.	0
3		OPEN ADITS	50 EA.	0
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	0
5		HAZ. STRUCTURES	40 EA.	0
6		EXPLOSIVES		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 THRU 7	0
9		POPULATION - 1 MILE		0
10	TARGETS	NEAREST RESIDENCE		0
11		RECREATIONAL USE		5
12		TARGETS SCORE	SUM LINES 9 THRU 11	5
13		SITE SAFETY SCORE	(LINES 1 x 8 x 12) / 1,000	0.00



31-037, #22: Collapsed adit and foundation



31-037, #23: AD-1 sample location



31-037, #24: Foundation and two shafts



31-037, #25: Tailings in roadcut

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: WALLACE CREEK MILLSITE PA#: 32-019

Date: June 30, 1994 Time: 0850-1345

Field Team Leader: Bisch, Pioneer

Sampling Personnel: Flammang, Clark, West; Pioneer

Visitors: None

Weather/Seasonality Observations: Sunny; very hot (70°-80°F).

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #1: Grizzly (screen)
and mill; #2: Mill; #3, #4: Dead bear in Wallace Creek; #23: TP-2,
lower tailings pond; #24: TP-1, upper tailings pond.
Video Tape No. 1

General Comments/Observations (not covered specifically in attached Inventory Forms): The mill building is deteriorating badly.

Other Hazardous Materials/Substances Present: 14 bags (100 lb.)
soda ash; 5 gallon barrel Toluene; 55 gallon barrel (3/4 full) of
unknown fine solid material (hand labeled table concentrate); 500
gallon diesel fuel tank present by sawmill, appears to be empty but
may contain sludge (small spills present below nozzle).

General Comments on Potential Remedial Alternatives: Amend or
apply coversoil and revegetate tailings ponds in place.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): WALLACE CREEK MILLSITE PA#: 32-019

Legal Description: T 12N ; R 17W ; Sec. 24 , SW 1/4 SE 1/4 1/4

County: MISSOULA Mining District: CLINTON

Latitude: N 46° 47' 44" Longitude: W 113° 40' 27"

Primary Drainage Basin and Code: Clark Fork River/17010201

Secondary Drainage Basin: Wallace Creek

USGS Quadrangle map name(s): Clinton

Mine Type/Commodities: Millsite/Gold, Silver, Copper, Lead

Activity Status: Active , Inactive/Exploration X , Abandoned .

Ownership: Known Y N X ; private/public? Private

Owner, Agent, or Contact (Include address and phone when available): Unknown

Relationship to other mines/sites in the area/district: Unknown

Regulatory Status (Activity by other agencies)? Hardrock permits?

Past Reclamation Activities? N/A

General site features: Elevation 3840' , Slope 5°-10° ,
Aspect West

Land use: Mining , Recreational , Residential X , Urban ,
Agricultural , Other (Specify)

Area of disturbed/unvegetated lands? 2 acre(s) .

Site Dimensions: 300 feet x 300 feet

Predominant vegetation types: Knapweed, willow, Douglas fir

Access: roads - good (paved) , poor (maintained dirt road) X ,
4wd , trail .

Other logistical considerations (proximity to other sites).
Millsite located approximately 1 mile downstream (Wallace Creek)
from the Hidden Treasure Mine.

Well logs within 1 mile radius; (Attach MEMG Well Log Printout(s): There are 24
wells reported within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also
note presence of radioactive minerals). Wallace Creek, an intermittent stream,
flows along the north edge of the site. Flow in the stream is
influenced by the presence of springs along the drainage. Water
flows west to confluence with Clark Fork River 1.5 miles
downstream; the Clark Fork River flows north. The site is most
likely underlain by granodiorite.

Mining/milling history, ore type/tenor, host rock, gangue: In the
Clinton mining district, chalcopyrite is the primary ore mineral in
lodes formed in granodiorite. Vein fillings consist of
specularite, chalcopyrite, ankerite, calcite, and quartz. No
additional information on the Wallace Mill available.

Mine Operation?

Shafts - Yes___, No X, # ____, Comment_____
Adits - Yes___, No X, # ____, Comment_____
Pits - Yes___, No X, # ____, Comment_____
Placers - Yes___, No X, # ____, Comment_____
Other - Yes___, No X, # ____, Comment_____

Mill Operation? Yes X, No____. If yes answer the next three
questions:

Period(s) of Operation: Mill operated through 1981; beginning date
unknown.

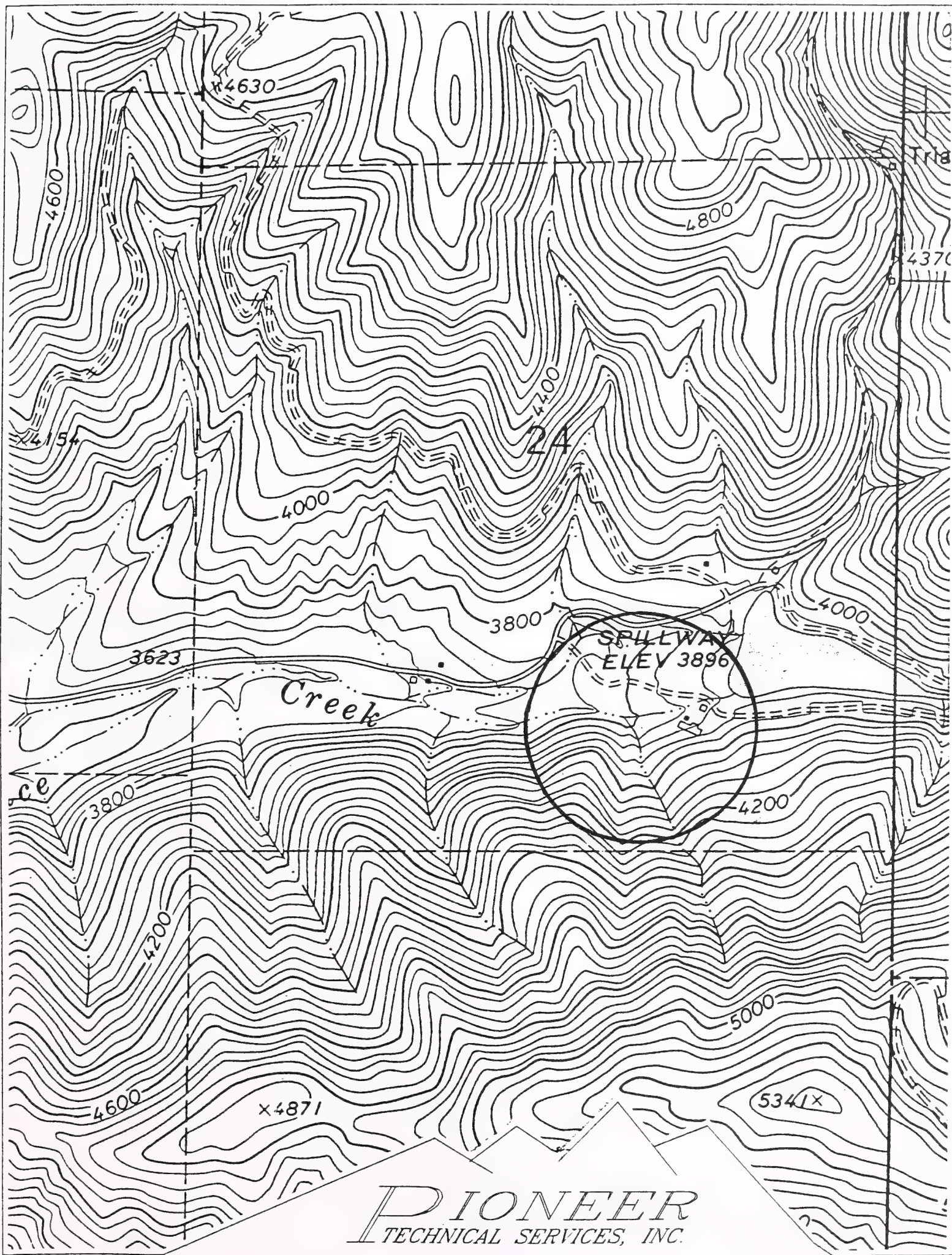
Origin of Ore Milled - Custom Mill X Dedicated Mill____; Number and
names of mines that supplied mill feed: Processed ore from
Lewistown mines (Spotted Horse) at least in 1981.

Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting?
CN⁻ leach process

Montana Bureau of Mines and Geology
Water Well Log Data

08/12/1994

Well No.	Location	Depth	Yield	Static Water Level
M:66651	12N 17W 23	183.0	4.0	60.00
M:66652	12N 17W 23 CC	100.0	25.0	65.00
M:66654	12N 17W 23 D	520.0	0.0	0.00
M:66653	12N 17W 23 D	70.0	15.0	40.00
M:133890	12N 17W 23 DCB	268.0	0.5	64.00
M:66655	12N 17W 23 DD	140.0	7.0	55.00
M:66661	12N 17W 24	175.0	6.0	62.00
M:66656	12N 17W 24	190.0	20.0	90.00
M:66658	12N 17W 24	110.0	6.0	60.00
M:66660	12N 17W 24	90.0	10.0	35.00
M:66657	12N 17W 24	140.0	10.0	50.00
M:66662	12N 17W 24	260.0	12.0	24.00
M:66659	12N 17W 24	180.0	3.0	70.00
M:66663	12N 17W 24	130.0	2.0	35.00
M:133892	12N 17W 24	108.0	15.0	70.00
M:134672	12N 17W 24 C	60.0	40.0	10.00
M:128972	12N 17W 24 C	80.0	30.0	50.00
M:66665	12N 17W 24 C	90.0	6.0	70.00
M:66664	12N 17W 24 C	120.0	15.0	34.00
M:128973	12N 17W 24 C	80.0	30.0	37.00
M:66666	12N 17W 24 C	220.0	30.0	2.00
M:66667	12N 17W 24 CA	38.0	20.0	23.00
M:66668	12N 17W 24 DBAD	76.0	5.0	10.00
M:66510	12N 16W 19 B	250.0	0.0	188.00



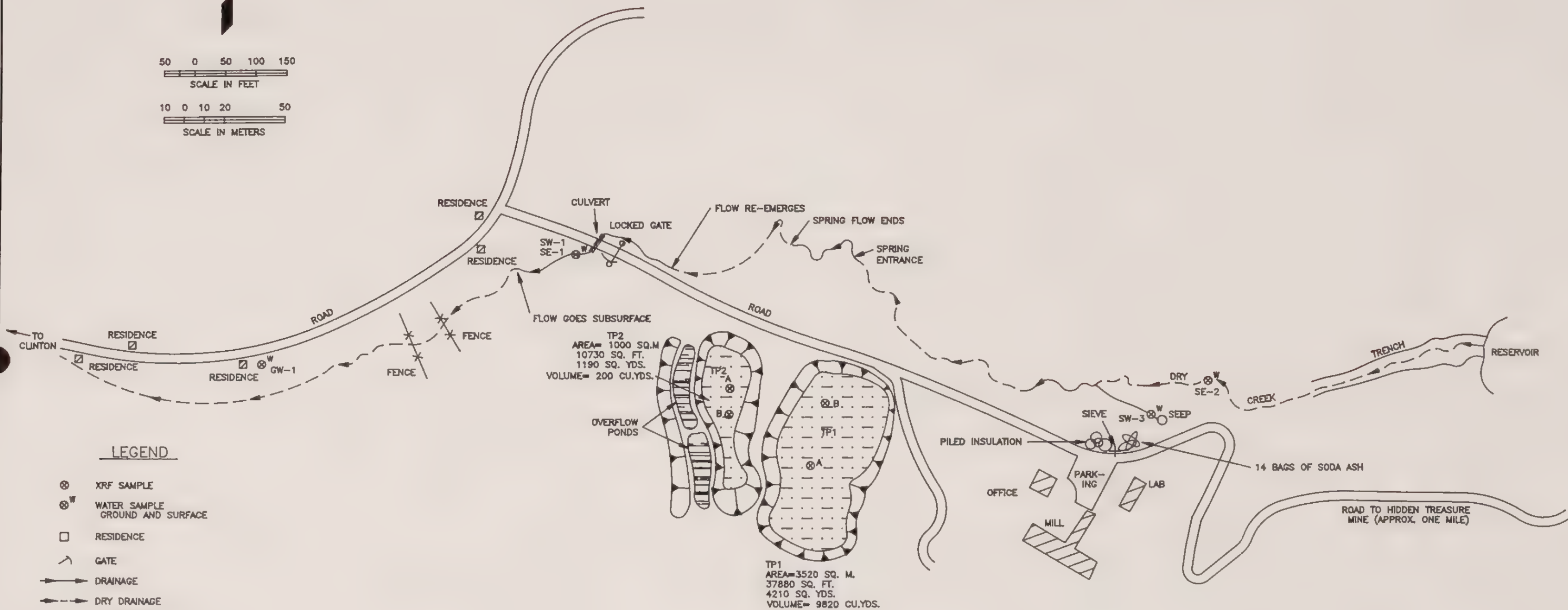
PIONEER
TECHNICAL SERVICES, INC.

WALLACE CREEK MILLSITE, P.A. NO. 32-019
T12N, R17W, SECTION 24
SCALE: 1" = 1000'



50 0 50 100 150
SCALE IN FEET

10 0 10 20 50
SCALE IN METERS



LEGEND

- ⊗ XRF SAMPLE
- ⊗^W WATER SAMPLE GROUND AND SURFACE
- RESIDENCE
- GATE
- DRAINAGE
- - - DRY DRAINAGE
- · · SUB-SURFACE FLOW
- X-X- FENCE
- ==== IMPROVED ROAD
- - - UNIMPROVED ROAD
- ==== CULVERT
- ▨ STRUCTURE
- ⊕ TAILINGS POND
- ⊕ PONDED WATER
- ↑ SLOPE DIRECTION
- ⊕ WASTE ROCK DUMP OR TAILINGS PILE

DRAWN FOR:

PIONEER
TECHNICAL SERVICES, INC.

TITLE:

WALLACE CREEK MILLSITE
PA# 32-019

DRAWING NO.: PT430205

REV: -

DATE: 12/4/94

PLOT SCALE: 1" = 50'

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): TP-1 is 50% sand, 10% clay, and 40% silt. TP-2 is 100% silt.

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): TP-1 south has a maximum depth of 10' before liner; 0-7.5' is medium brown sand; 7.5-10' is medium brown clayey sand with a grayish tinge. TP-1 north has a 4' depth; 0-4' is medium brown silt. TP-2 has an 8" depth before liner and is medium brown loam.

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): TP-1 is moist at 2' and saturated at 4.5'. TP-2 is dry.

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): Tailings earthen dams intact; overflow dam/pond intact. Tailings impoundments are lined; however, integrity of liners is unknown.

Comments on potential for mitigation: Possible revegetation; both tailings ponds are partially revegetated by natural pioneering.

SOURCE INVENTORY FORM

SAMPLERS: Flammang, West

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd ³)	LOCATION/DESCRIPTION	CONTAINMENT	PH SU (D/S)	RADIO-ACTIVITY (MR/HR)	LAB. SAMPLE NO.	DATE/TIME	ANALYSES
TP-1A-A	TAIL	9,820	Center of TP-1, on south unvegetated part, borehole; 0-4.5', dry to damp medium brown sand	Dam, Liner	7.0 (D)	0.045	32-019-TP-1	06/30/94 1630	T-Metals, ABA, Cyanide
TP-1A-B	TAIL		4.5'-7.5', saturated medium brown sand	Dam, Liner	5.6 (D)	0.025			
TP-1A-C	TAIL		7.5'-10', very saturated gray/brown sand with clay	Dam, Liner	5.2 (D)	0.035			
TP-1B-A	TAIL		North end of pond in center of vegetated area, borehole; 0-2', dry medium brown silt	Dam, Liner	6.6 (D)	0.025			
TP-1B-B	TAIL		2'-4', hardpack medium brown clay	Dam, Liner	6.2 (D)	0.04			
TP-2A	TAIL	200	Middle of TP-2, borehole; 0-8", loam	Dam, Liner	5.0 (D)	0.04	32-019-TP-2	06/30/94 1700	T-Metals, ABA, Cyanide
TP-2B	TAIL		South center; 0-4", loamy texture	Dam, Liner	5.1 (D)	0.04			
TP-2C	TAIL		Surface sample from pile on northeast side of TP-2; yellow	Dam Liner	5.4 (D)	0.03	N/A	N/A	XRF Analysis
TP-3	TAIL	N/A	North end of north overflow pond, grab sample; 0-2", hardpack pinkish/brown silt, base soil	Dam	7.84 (S)	0.06	N/A	N/A	XRF Analysis

D-Direct reading (slurry Meter); S-Saturated Paste (Ozium Meter)

Comments or deviations from SOPs: 32-019-TP-1 is composite of TP-1A-A through -1A-C, and TP-1B-A and -1B-B. 32-019-TP-2 is composite of TP-2A and -2B. See Linton Mine (32-017) for background soil sample (1993 inventory data).

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes___, No X, Number:___ Identification:_____

Filled shafts: Yes___, No X, Number:___ Identification:_____

Seeps/Springs: Yes X, No___, Number: 2 Identification: Seep 80'
north of assay lab building; flow disappears into the ground after 30'
surface expression in drainage.

Groundwater wells within 4 miles?: Yes X, No___;
Number of well logs: 267

Distance to nearest source used for drinking:
X <1,000 ft; ___ 1,000 ft to 0.5 miles; ___ >0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite___, Probable___, Possible X, Unlikely___.

Potential for groundwater contamination if liners are damaged or
otherwise ineffective.

Approximate Depth to Groundwater: X <25 ft; ___ 25 - 100 ft; ___ >100 ft.

Other observations/notes: James Baker residence and shop was sampled
(James Baker, JB Welding, Wallace Creek Road, Clinton, MT). James Baker
said that he has a stainless steel perforated pipe capturing spring flow
which is stored in a stainless steel tank on the north end of the
property. Water then flows by gravity 500 feet in a black PVC pipe to
pump house, then into residence. No filters are used and he did not
know flow rate.

SAMPLERS: Flammand

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes X, No , Name(s): Spring by lab flows into Wallace Creek, which then flows for a short distance. Spring between lab and road crossing causes Wallace Creek to flow for another short distance. Spring by road crossing causes creek to flow approx. 100'.

Dry streambeds: Yes X, No , Name(s): Wallace Creek is dry below reservoir and for most of its length.

Other surface water: Yes X, No , Name(s)/Description: Wallace Creek Reservoir is located above the site (not sampled).

Waste materials within any floodplain: Yes X, No Source ID(s): TP-1, TP-2, Overflow ponds

Approximate Flood frequency? 1 yr, 10 yr, X 100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? 5 gpm
High Flow: 50 gpm, **Average Flow:** 0

Distance between waste source(s) and nearest surface water body (ft)? 300+ feet between springs and TP-1

Surface water draining onto or through waste sources: Yes , No X,
Describe: Runoff, precipitation only

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Irrigation, agriculture; Clark Fork River has recreation, fishery, and wetlands.

Observed erosional/sedimentation/stream turbidity problems? Yes , No X. **Distance downstream (ft)?** 0-500 ; 500-1,000 ; >1,000 .
Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present):

SAMPLERS: Bisch

6 (M) pernean 30 (M) potwistg : 6072

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO₃)
Presence of evaporative salt deposits? (ESD)
Discolored or turbid seepage? (SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?
Presence of ferric hydroxide precipitates? (FEOX)
Presence of burned or stressed vegetation? (VEG)
pH \leq 5.0 (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? Approx. 3 to 5 acres where tailings ponds, overflow ponds and sawmill are presently located.

Wetlands present: Yes ☐, No ☒, Describe: _____

Carbonate rocks/soils: Yes ☐, No ☒, Describe: _____

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10 ☐; 10-30 ☐; 30-100 ☒; 100-300 ☐; 300-1,000 ☐; 1,000-3,000 ☐; 3,000-10,000 ☐; 10,000 or greater ☐; Comments _____

Nearest residence: ☒ <1,000 ft; ☐ 1,000 ft - 0.5 miles; ☐ >0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

SAMPLERS: Flammang, West

Notes and Clarifications: Wind ruffles present on unvegetated part of TP-1.

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X,
Describe:_____

Population within 1 mile: 1-10____; 10-30 X; 30-100____; 100-300____;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____;
Comments_____

Evidence of recreational use on site: Yes X, No____, Describe: Human
tracks; litter

Accessibility (check each that apply):____ Easily accessible - no fences,
gates, or warning signs; X Moderately Accessible - barbed wire fences,
road gated, or signs posted;____ Difficult Access - chain-link fence,
road gated and locked, site guarded (does not include locked or manned
access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment_____
Wilderness Area - Yes____, No X, Comment_____
T&E Species Habitat - Yes X, No____, Comment Bald Eagle
Bat Habitat - Yes____, No X, Comment_____

Primary Drainage X; Secondary Drainage____; No Information____:

Riparian Habitat Quality - High____, Medium X, Low____

Wetlands Frontage - High____, Medium X, Low____

Fisheries Habitat and Species Classification - 3

Sport Fishery Classification - 2

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes____, No X, Number____, types and locations:_____

Hazardous structures: Yes X, No____, Number 1, types and locations:____
Mill building

Unstable highwalls, pits, trenches, slopes: Yes____, No X, Number____,
types and locations:_____

Unstable waste piles, impoundments, undercut banks: Yes____, No X,
Number____, types and locations:_____

Fire and/or Explosion hazards: Yes____, No X, Explain:_____

Bibliography

MBMG, Form 39, Wallace Creek Custom Mill, 1981-1984, 1986.

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0, Prepared by Montana Natural Resource Information System, December 1989.

MDSL/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for Wallace Creek Millsite, Prepared by Northern Engineering and Testing, July 23, 1987.

USGS, Topographic Map, Clinton, Montana, 7 1/2 minute Quadrangle, 1965.

LABORATORY ANALYTICAL DATA

**WALLACE CREEK MILLSITE
PA NO. 32-019**

Wallace Creek Millsite PA# 32-019
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - BISCH
INVESTIGATION DATE: 06/30/94

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	Ag (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
32-019-SE1	1.6 JX	6.9 UJ	256	0.7 UJ	2.3 U	5.3 J	52.9 J	5040	0.09	166 J	20.7 JX	17.8	7.7 U	54.9 J	NR
32-019-SE2	0.5 UJX	6.0 J	314	1.6 J	8.6 J	12.0 J	49.5 J	10500	0.08	628 J	9.6 JX	31.2	4.9 U	31.7 J	NR
32-019-TP1	3.6 JX	67.5 J	276	0.5 J	1.4 U	6.0 J	34.5 J	9590	1.05	695 J	2.6 JX	322	4.9 U	242 J	0.281
32-019-TP2	11.8 JX	118 J	300	1.8 J	2.9 J	12.9 J	52.7 J	14000	4.52	988 J	14.6 JX	544	12.8	442 J	<0.222
BACKGROUND	NR	17 JX	95	0.5 U	1.9 J	5.4 J	17.6	8760 J	0.081	747	9 J	63 J	4 U	57 J	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL POTENT		SULFUR ACID BASE POTENT		SULFATE		PYRITIC		ORGANIC		PYRITIC		SULFUR	
	%	1/1000t	%	1/1000t	%	1/1000t	%	1/1000t	%	1/1000t	%	1/1000t	%	1/1000t	%	1/1000t
32-019-TP1	0.09	2.81	437	383	<0.01	434	0.13	4.06	0.15	4.37	0.03	4.37	0.15	4.37	0.03	4.37
32-019-TP2	0.06	1.87	383	382	<0.01	382	0.14	4.37	0.03	4.37	0.03	4.37	0.14	4.37	0.03	4.37

WATER MATRIX ANALYSES

Metals in Water
Results in ug/L

FIELD ID	Ag	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
32-019-GW1	0.12 U	1.3 UX	301	2.6 U	8.7 U	4.7 U	21.3	30.0	0.11 U	4.4 U	8.0 U	1.2	29.4 U	930 J	81.8
32-019-SW1	0.12 U	1.3 UX	295	2.6 U	8.7 U	4.7 U	4.6 U	11.1	0.11 U	4.4 U	8.0 U	1.1 U	29.4 U	5.0 J	92.9
32-019-SW3	0.12 U	1.3 UX	252	2.6 U	8.7 U	4.7 U	4.6 U	9.4 U	0.11 U	4.4 U	9.4	1.1 U	29.4 U	4.5 U	74.4

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Wet Chemistry
Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
32-019-GW1	90	<5.0	7.0	0.09	0.01
32-019-SW1	124	<5.0	7.0	0.07	<0.005
32-019-SW3	86	<5.0	8.0	0.07	<0.005

LEGEND

SE1 - Downstream from the site in Wallace Creek.

SE2 - Upstream in Wallace Creek under power line (no water).

TP1 - Composite of sub-samples TP1A-A through 1A-C and 1B-A through 1B-B.

TP2 - Composite of sub-samples TP2A and 2B.

BACKGROUND - From the Linton Mine (32-017-SS1) (1993 Data).

GW1 - Residential spring from IB Wellhead and residence located 800' downstream of site; used as a drinking water source.

SW1 - Same as sample 32-019-SE1.

SW3 - Spring 80' north of the building.

XRF ANALYSIS RESULTS

**WALLACE CREEK MILLSITE
PA NO. 32-019**

Mine Name: Wallace Creek Millsite PA# 32-019

XRF Field Analyses
Results in PPM

XRF SAMPLE I.D.	CrHl	K	Ca	Ti	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Sr
32-019-SE1000		33296.7	13464.1	2128.41		831.874 *	18054.5				111.347 *	79.0608 *	302.002
32-019-SE500		32104.1	9597.05	1998.57		818.201 *	17523.1			76.4192 *	94.7948 *	99.2819 *	174.411
32-019-TP1AA		18037.6	118426	351.363 *		816.679 *	6636.43				215.046 *	138.645 *	274.852
32-019-TP1AB		22475.8	145910	752.846 *		795.822 *	10366.4				283.534	149.779 *	349.712
32-019-TP1AC		23222.2	157508	459.889 *		1018.84 *	9806.46			103.188 *	249.743 *	96.7405 *	393.971
32-019-TP1BA		22416.9	107046	412.611 *		955.777 *	9722.93				329.14	145.98 *	356.015
32-019-TP1BB		33616.1	129112	518.634 *		1128.08 *	10423.6			128.625 *	408.648	134.525 *	375.354
32-019-TP1-COMP		21189.3	122428	342.909 *		911.235 *	7415.55				221.326 *	108.404 *	288.763
32-019-TP2A		27017.4	108798	599.499 *		1119.75 *	12765.2			85.1589 *	447.694	114.759 *	355.641
32-019-TP2B		27208.5	107224	557.411 *		1170.96 *	12804.7				468.131	111.603 *	346.683
32-019-TP2C		12795.5	2859.86	394.801 *		3045.42	20661.2			1081.7	209.91 *	165.313 *	75.3638
32-019-TP2-COMP		30870.1	117230	618.236 *		1170.22 *	12957.9				436.331	116.676 *	362.926
32-019-TP3		48190.4	4857.85	2085.63		701.954 *	17054.3				67.3313 *	79.8712 *	96.394

XRF SAMPLE I.D.	Zr	Hg	Mo	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th
32-019-SE1000	219.633		10.6585 *		89.1198				813.023			16.236 *
32-019-SE500	204.085				89.5455				691.908			15.186 *
32-019-TP1AA	79.734			70.5193 *	97.7004				358.349			
32-019-TP1AB	105.367			129.585 *	113.847				480.602			11.8923 *
32-019-TP1AC	96.6271			207.38	112.273				447.38			
32-019-TP1BA	76.3465			209.391	106.491				321.86			11.2963 *
32-019-TP1BB	69.6852		8.14664 *	343.608	114.894				366.918			16.2386 *
32-019-TP1-COMP	106.111			110.041 *	107.329				436.896			
32-019-TP2A	88.3592			399.038	136.801				286.491			
32-019-TP2B	87.0136			412.512	120.538				316.066			
32-019-TP2C	126.706		78.3553	836.466	74.202			72.037 *	1110.85			
32-019-TP2-COMP	83.1231			433.615	131.443			53.9282 *	387.083			
32-019-TP3	334.244				131.432				681.831		17.7571 *	15.9669 *

* = Estimated Quantity

\$ = Unvalidated Data

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**WALLACE CREEK MILLSITE
PA NO. 32-019**

AIMSS SCORESHEET

SITE NAME:
PA NUMBER:

Wallace Creek Mill
32-019

LINE NO.		GROUNDWATER PATHWAY	
1		OBSERVED RELEASE	300
2		EXCEEDENCES	0
3A	GW - LIKELIHOOD OF RELEASE	CONTAINMENT	5
3B		GW DEPTH	20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
6		WELLS - 1 MI. x 2.5	60.0
7	GW - TARGETS	WELLS - 1 TO 4 MI	243
8		NEAREST WELL	10
9		TARGETS SCORE	LINES 6 + 7 + 8
10		GROUNDWATER SCORE	LINES 4 x 5 x 9
			195437
		SURFACE WATER PATHWAY	
11		OBSERVED RELEASE	0
12		EXCEEDENCES	0
13A	SW - LIKELIHOOD OF RELEASE	CONTAINMENT	5
13B		DISTANCE TO SW	2
13C		POTENTIAL TO RELEASE	LINES 13A x 13B
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
16		DRINKING WATER POP'N	0
17		IMPACTED DRAINAGE	0
18		WETLANDS	10
19	SW - TARGETS	FISHERY	5
20		RECREATION	5
21		IRRIGATION/STOCK	2
22		T & E SPECIES HABITAT	5
23		TARGETS SCORE	SUM LINES 16 THRU 22
24		SURFACE WATER SCORE	LINES 14 x 15 x 23
			449
		AIR PATHWAY	
25		OBSERVED RELEASE	0
26A	AIR - LIKELIHOOD OF RELEASE	CONTAINMENT	5
26B		DISTANCE TO POPULATION	20
26C		POTENTIAL TO RELEASE	LINES 26A x 26B
27		LIKELIHOOD SCORE	LINES 25 + 26C
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
29		POPULATION - 4 MILES	30
30		NEAREST RESIDENCE	10
31	AIR - TARGETS	WETLANDS	10
32		PARKS / WILDERNESS	0
33		T & E SPECIES HABITAT	5
34		TARGETS SCORE	SUM LINES 29 THRU 33
35		AIR PATHWAY SCORE	LINES 27 x 28 x 34
			336
		DIRECT CONTACT PATHWAY	
36		OBSERVED EXPOSURE	50
37A	LIKELIHOOD OF EXPOSURE	ACCESSIBILITY	10
37B		DISTANCE TO POPULATION	20
37C		POTENTIAL EXPOSURE	LINES 37A x 37B
38		LIKELIHOOD SCORE	LINES 36 + 37C
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
40		POPULATION - 1 MILE	10
41	DIRECT CONTACT TARGETS	NEAREST RESIDENCE	10
42		RECREATIONAL USE	5
43		TARGETS SCORE	SUM LINES 40 THRU 42
44		DIRECT CONTACT SCORE	LINES 38 x 39 x 43
			356
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE (LINES 10 + 24 + 35 + 44) / 100,000		1.97

SITE NAME: Wallace Creek Mill
PA NUMBER: 32-019

LINE
NO.

SITE SAFETY

1	THREAT	ACCESSIBILITY		10
2		OPEN SHAFTS	100 EA.	0
3		OPEN ADITS	50 EA.	0
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	0
5		HAZ. STRUCTURES	40 EA.	40
6		EXPLOSIVES		100
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 THRU 7	140
9		POPULATION - 1 MILE		10
10	TARGETS	NEAREST RESIDENCE		10
11		RECREATIONAL USE		5
12		TARGETS SCORE	SUM LINES 9 THRU 11	25
13		SITE SAFETY SCORE	(LINES 1 x 8 x 12) / 1,000	35.00



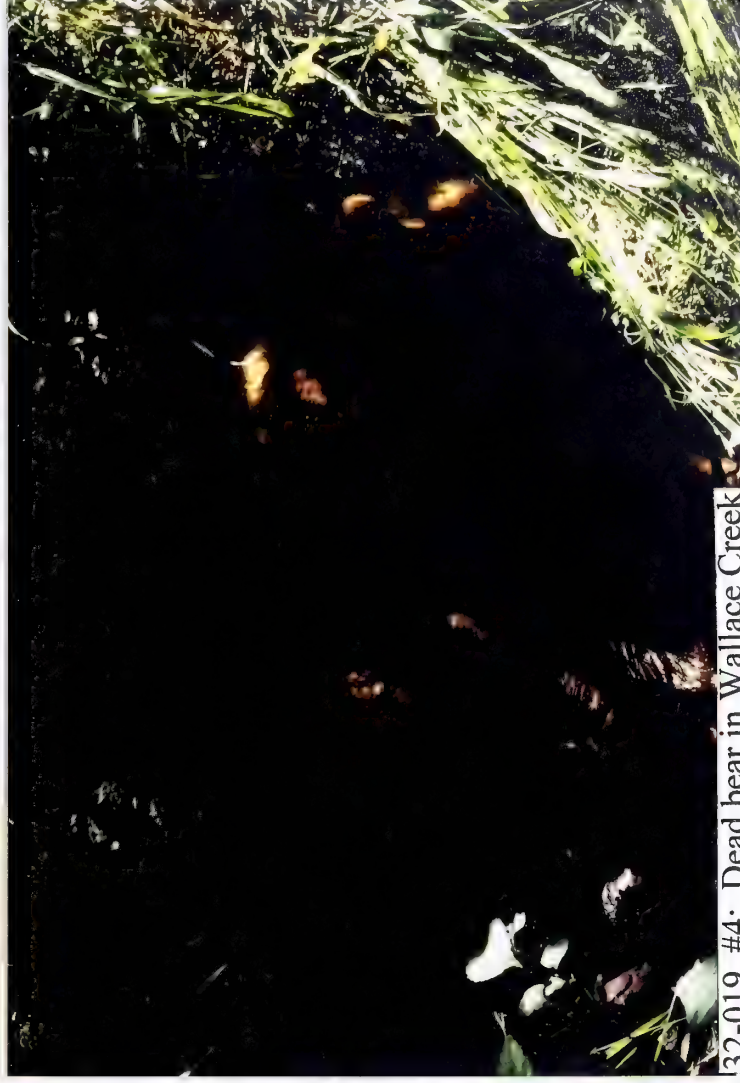
32-019, #1: Grizzly (screen) and mill



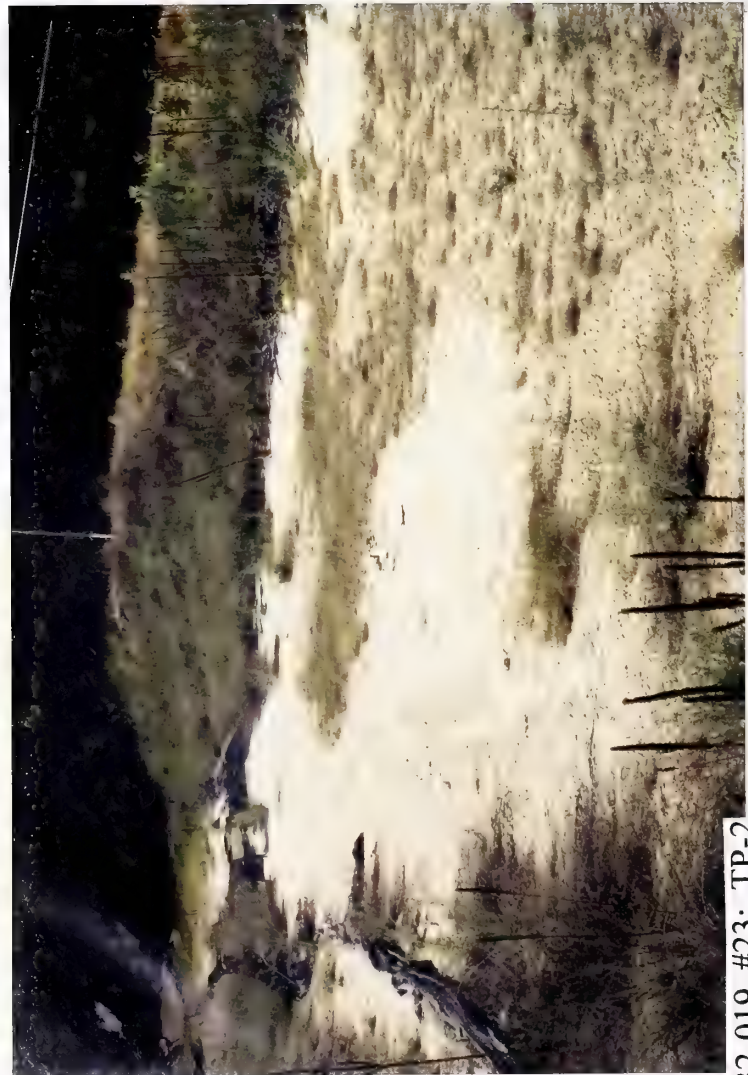
32-019, #2: Mill



32-019, #3: Dead bear in Wallace Creek



32-019, #4: Dead bear in Wallace Creek



32-019, #23: TP-2



32-019, #24: TP-1

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: COPPER CLIFF PA#: 32-001

Date: June 28, 1994 Time: 1025-1315

Field Team Leader: Bisch, Pioneer

Sampling Personnel: Flammang, Clark, West; Pioneer

Visitors: None

Weather/Seasonality Observations: Sunny; warm (approximately 70°F).

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #1: Collapsed shaft; #2: WR-1, loadout, and Copper Cliff facing east; #3: WR-3; #4: WR-4 facing west; #5: WR-5 facing west; #6: SE-2 sample location at base of WR-5 facing west; #25: SE-2 upgradient sample location; #26: SE-1 sample location. Video Tape No. 1

General Comments/Observations (not covered specifically in attached Inventory Forms): Located four additional waste rock dumps in drainage (unnamed intermittent tributary to Union Creek) that were not mentioned in previous inventory. There is one collapsed adit and one collapsed shaft present at the site.

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Remove or isolate portions of WR-1, WR-4, and WR-5 that are in drainage channel. Recontour, amend or coversoil, and revegetate waste rock.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): COPPER CLIFF PA#: 32-001

Legal Description: T 12N ; R 15W ; Sec. 11 , NW 1/4 SW 1/4 1/4

County: MISSOULA Mining District: COPPER CLIFF

Latitude: N 46° 48' 0.0" Longitude: W 113° 27' 14.7"

Primary Drainage Basin and Code: Union Creek/17010203

Secondary Drainage Basin: Union Creek

USGS Quadrangle map name(s): Union Peak

Mine Type/Commodities: Hardrock/Copper, Silver, Gold

Activity Status: Active , Inactive/Exploration , Abandoned X .

Ownership: Known Y N X ; private/public? Private

Owner, Agent, or Contact (Include address and phone when available): Unknown

Relationship to other mines/sites in the area/district: The Frogs Diner Mine is located 1/4 mile northeast; The Leonard Mine is 1/4 mile south.

Regulatory Status (Activity by other agencies)? Hardrock permits?
Past Reclamation Activities? N/A

General site features: Elevation 4800'-5000', Slope 15°,
Aspect Southeast (cliff); Northeast

Land use: Mining , Recreational X, Residential , Urban ,
Agricultural , Other (Specify)

Area of disturbed/unvegetated lands? 1.5 acre(s) .

Site Dimensions: 350 feet x 175 feet

Predominant vegetation types: Quaking aspen, alder, willow, Lodgepole pine, Douglas fir

Access: roads - good (paved) , poor (maintained dirt road) ,
4wd X, trail .

Other logistical considerations (proximity to other sites). There are many new roads in the area not indicated on Forest Service or topographic maps. There is a locked gate on Union Creek Road several miles below the mine; use Cramer Creek Road or Tenmile Creek Road (rutted).

Well logs within 1 mile radius; (Attach MBMG Well Log Printout(s): There is 1
well reported within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also
note presence of radioactive minerals). The site is underlain by Precambrian
quartzite and shale, and Cambrian limestone that have been faulted
together. Site lies on both sides of dry drainage, which drains
northeast to Union Creek. Union Creek, a perennial stream, is
approximately 700 feet below WR-3 and flows north to confluence
with the Blackfoot River approximately 11 miles away.

Mining/milling history, ore type/tenor, host rock, gangue: The
lode was discovered in 1890. Production for 1905 through 1910 was
310 tons of ore which yielded 77,000 lbs. of copper and a little
gold and silver. Ore shipments contained from 9.5 to 22% copper
and from 0.5 to 1 oz. silver. Enargite and silica form the cement
in a quartzite breccia which is considered the lode.

Mine Operation?

Shafts - Yes X, No , # 1, Comment Collapsed w/ wood debris
Adits - Yes X, No , # 1, Comment Collapsed
Pits - Yes , No X, # , Comment
Placers - Yes , No X, # , Comment
Other - Yes X, No , # 2, Comment "Copper Cliff" highwall;
trench

Mill Operation? Yes , No X. If yes answer the next three
questions:

Period(s) of Operation: N/A

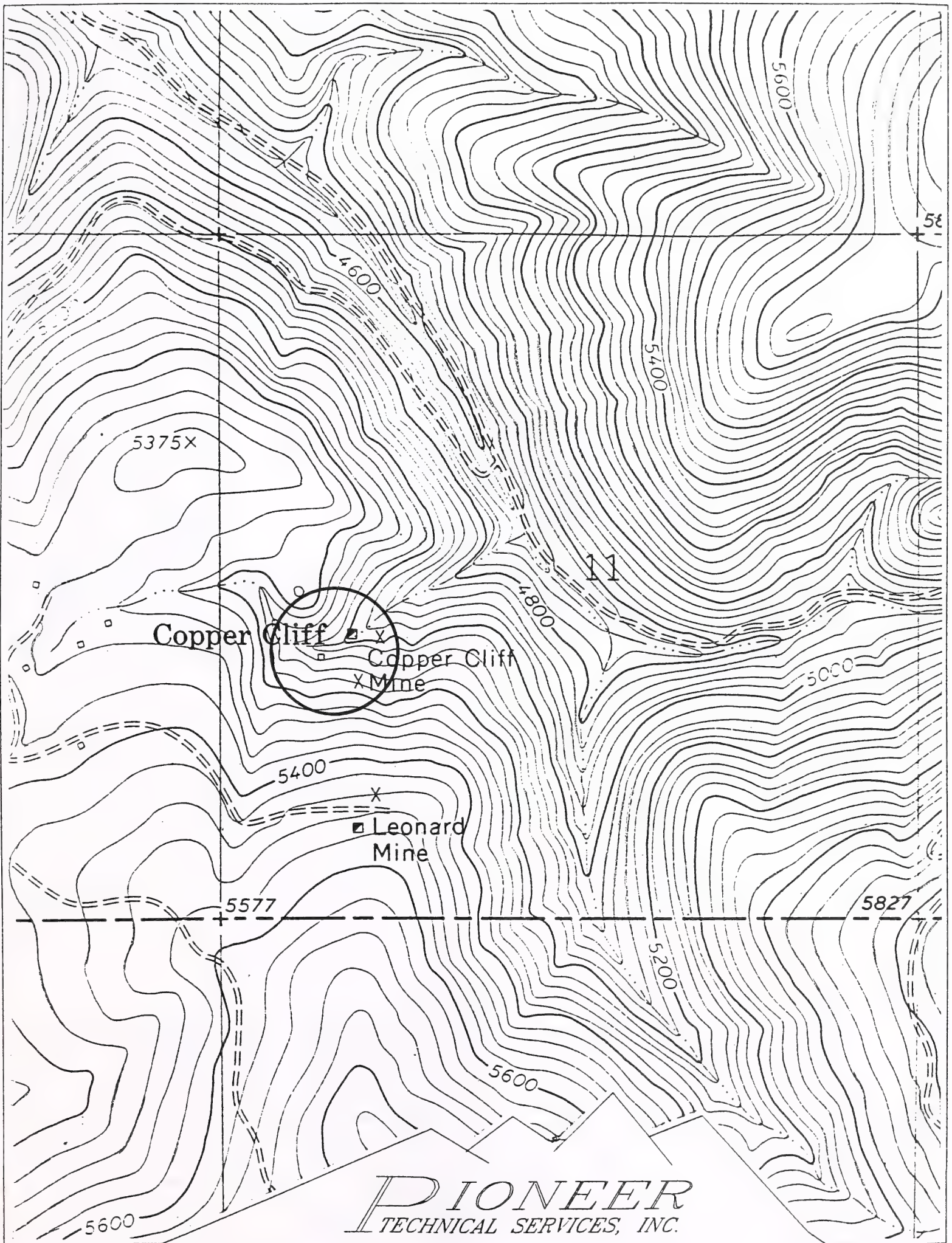
Origin of Ore Milled - Custom Mill Dedicated Mill ; Number and
names of mines that supplied mill feed: N/A

Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting?
N/A

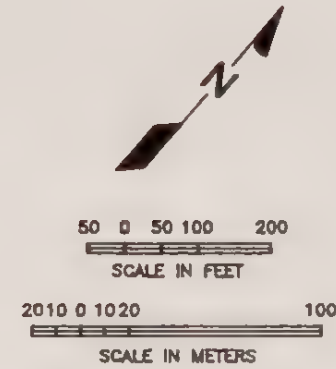
Montana Bureau of Mines and Geology
Water Well Log Data

08/12/1994

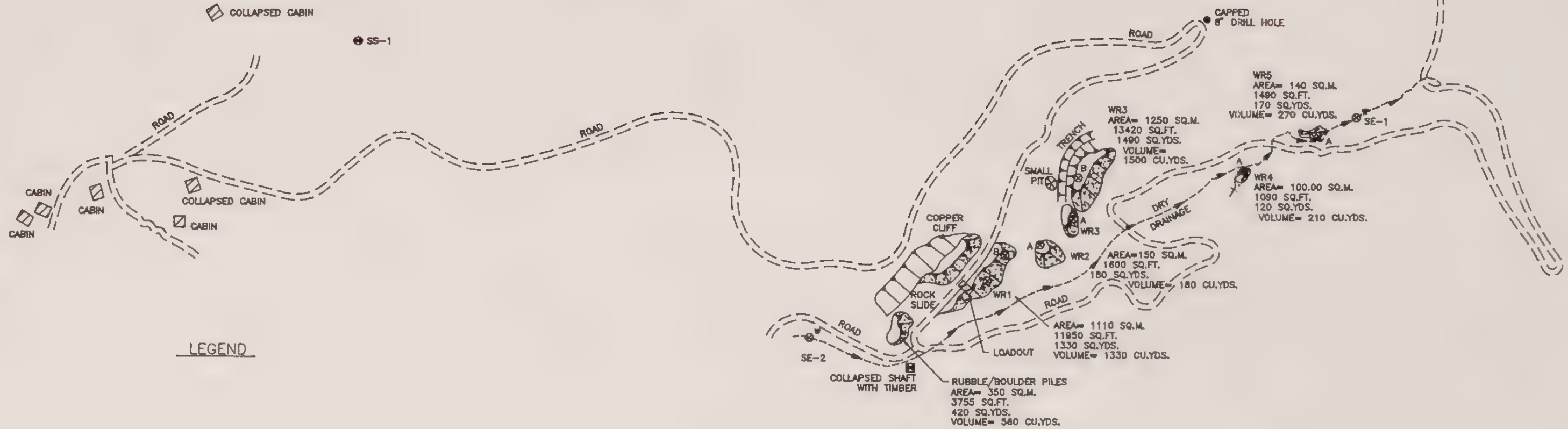
Well No.	Location	Depth	Yield	Static Water Level
66507	12N 15W 12 DD	50.0	40.0	17.00



COPPER CLIFF, P.A. NO. 32-001
T12N, R15W, SECTION 11
SCALE: 1" = 1000'



FROGS DINER MINE
PA# 32-027



LEGEND

- | | | | |
|-----|---------------------------------|-------|----------------------------------|
| ⊗ | XRF SAMPLE | ===== | IMPROVED ROAD |
| ⊗ | WATER SAMPLE GROUND AND SURFACE | ----- | UNIMPROVED ROAD |
| ● | DRILL HOLE | ==== | CULVERT |
| ⊙ | SOIL SAMPLE | → | DRAINAGE |
| └─┘ | OPEN ADIT | → | DRY DRAINAGE |
| ✕ | COLLAPSED ADIT | ✕✕✕ | FENCE |
| ⊠ | OPEN SHAFT | ▽ | SLOPE DIRECTION |
| ⊠ | COLLAPSED SHAFT | ⬢ | WASTE ROCK DUMP OR TAILINGS PILE |

DRAWN FOR:

PIONEER
TECHNICAL SERVICES, INC.

TITLE:

COPPER CLIFF
PA# 32-001

DRAWING NO.: PTJ40208

REV: -

DATE: 12/14/84

PLOT SCALE: 1"=80'

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): N/A

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): N/A

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): N/A

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): N/A

Comments on potential for mitigation: N/A

SOURCE INVENTORY FORM

SAMPLERS: Bisch

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd ³)	LOCATION/DESCRIPTION	CONTAINMENT	PH SU (D/S)*	RADIO-ACTIVITY (mR/HR)	IAB. SAMPLE NO.	DATE/TIME	ANALYSES
WR-1A	WR	1,330	Coarse brown sand below and north of loadout	None	6.8 (D)	0.03	32-001-WR-1	06/28/94 1600	T-Metals, ABA
WR-1B	WR		Fine yellow/gray sand on small lobe on north side of dump	None	4.3 (D)	0.035			
WR-2	WR	180	Orange sand on small dump situated in drainage; near middle north side	None	< 3.5 (D)	0.035	N/A	N/A	XRF Analysis
WR-3A	WR	1,500	Fine orange sand on south lobe of WR-3	None	5.5 (D)	0.04	32-001-WR-3	06/28/94 1400	T-Metals, ABA
WR-3B	WR		Fine gray sand on top of north lobe of WR-3	None	5.3 (D)	0.03			
WR-4	WR	210	Fine orange sand on very steep, lower dump above road eroded into drainage; near top, north facing slope	None	< 3.5 (D)	0.045	32-001-WR-4	06/28/94 1410	T-Metals, ABA
WR-5	WR	270	Coarse orange/yellow sand on very steep lower dump below road eroded into drainage; on top	None	5.4 (D)	0.04	N/A	N/A	XRF Analysis
Rubble	WR	ND	Rubble pile immediately south of Copper Cliff; middle of north facing slope	None	6.1 (D)	0.03	N/A	N/A	XRF Analysis
SS-1	SOIL	N/A	Background soil on ridge above site at ghost town	N/A	NM	NM	32-001-SS-1	06/28/94 1600	T-Metals

*D-Direct reading (Galvay Meter) ; B-Saturated Paste (Orion Meter)

Comments or deviations from SOPs: 32-001-WR-1 is composite of WR-1A and -1B. 32-001-WR-3 is composite of WR-3A and -3B. 32-001-WR-4 is a grab of WR-4. Toe of WR-1 is in intermittent dry drainage; WR-1 is extremely steep. WR-2, WR-4, and WR-5 are in drainage. Dry drainage is very heavily vegetated.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes___, No X, Number:___ Identification:___

Filled shafts: Yes___, No X, Number:___ Identification:___

Seeps/Springs: Yes___, No X, Number:___ Identification:___

Groundwater wells within 4 miles?: Yes X, No___;

Number of well logs: 82

Distance to nearest well used for drinking:

___<1,000 ft;___1,000 ft to 0.5 miles; X>0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite___, Probable___, Possible X, Unlikely___.

Precipitation and snowmelt could percolate through uncontained waste sources containing some elevated metals values and cause migration to groundwater.

Approximate Depth to Groundwater: X<25 ft;___ 25 - 100 ft;___ >100 ft.

Other observations/notes: N/A

SAMPLERS:

[illegible]

Flow: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes_____, No X, Name(s): Union Creek flows approximately 700 feet downstream from lowermost dump at the site.

Dry streambeds: Yes X, No_____, Name(s): Unnamed tributary to Union Creek

Other surface water: Yes_____, No X, Name(s)/Description:_____

Waste materials within any floodplain: Yes X, No____ Source ID(s): WR-1, WR-2, WR-4, and WR-5 in floodplain of unnamed tributary to Union Creek.

Approximate Flood frequency? X 1 yr, _____ 10 yr, _____ 100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? 0
High Flow: 1 cfs, Average Flow: 0

Distance between waste source(s) and nearest surface water body (ft)? Approximately 700 feet between WR-5 and Union Creek

Surface water draining onto or through waste sources: Yes_____, No X,
Describe: Runoff only

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Agriculture, wetlands, irrigation; Blackfoot River has recreation, fishery, wetlands, agriculture, and irrigation.

Observed erosional/sedimentation/stream turbidity problems? Yes X, No_____. Distance downstream (ft)? 0-500 X; 500-1,000____; >1,000____.
Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): Fines from lowermost dump present for 100 feet in drainage.

SAMPLERS: Flamman

2 (M) perusem 20 (S) potestis: NOTA

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Bisch

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH/MODERATE/LOW/NONE)
WR-1	pH	Dry	11,950	8,365	No	Low
WR-2	pH; FEOX	Dry	1,600	800	No	Low
WR-3	FEOX	Dry	13,420	10,735	No	Low
WR-4	pH; FEOX	Dry	1,090	1,035	No	Low
WR-5	FEOX	Dry	1,490	1,415	No	Low

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X,
Describe: _____

Population within 1 mile: 1-10 X; 10-30____; 30-100____; 100-300____;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____;
Comments _____

Evidence of recreational use on site: Yes X, No____, Describe: Vehicle
tracks on the many roads in the area.

Accessibility (check each that apply): X Easily accessible - no fences,
gates, or warning signs;____ Moderately Accessible - barbed wire fences,
road gated, or signs posted;____ Difficult Access - chain-link fence,
road gated and locked, site guarded (does not include locked or manned
access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment _____

Wilderness Area - Yes____, No X, Comment _____

T&E Species Habitat - Yes X, No____, Comment Bald Eagle;
Peregrine Falcon

Bat Habitat - Yes____, No X, Comment _____

Primary Drainage X; Secondary Drainage____; No Information____:

Riparian Habitat Quality - High____, Medium X, Low____

Wetlands Frontage - High____, Medium X, Low____

Fisheries Habitat and Species Classification - Not Rated

Sport Fishery Classification - Not Rated

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes____, No X, Number____, types and locations:____

Hazardous structures: Yes X, No____, Number____, types and locations:____
Metal loadout

Unstable highwalls, pits, trenches, slopes: Yes____, No X, Number____,
types and locations: There is a natural cliff on the site.

Unstable waste piles, impoundments, undercut banks: Yes X, No____,
Number 3, types and locations: WR-1, WR-4, and WR-5 have very steep
slopes; WR-4 and WR-5 are actively eroding.

Fire and/or Explosion hazards: Yes____, No X, Explain:____

Bibliography

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0,
Prepared by Montana Natural Resource Information System, December
1989.

MDHES/WQB, Analytical Data for Copper Cliff, October 9, 1980.

MDSL/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for
Copper Cliff, Prepared by Northern Engineering and Testing, August
27, 1987.

USGS, Ore Deposits on the Northwestern Part of the Garnet Range,
Montana, Bulletin 660, Written by J.T. Pardee, 1918.

USGS, Topographic Map, Union Peak, Montana, 7 1/2 minute Quadrangle,
1965.

LABORATORY ANALYTICAL DATA

**COPPER CLIFF
PA NO. 32-001**

Copper Cliff PA# 32-001
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - BISCH
INVESTIGATION DATE: 06/28/94

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	Ag (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
32-001-SE1	0.6 UJX	135 J	103	0.5 UJ	10.6 J	12.9 J	1140 J	21000	0.22	206 J	27.0 JX	50.9	5.8 U	760 J	NR
32-001-SE2	0.4 UJX	17.4 J	225	0.6 J	10.5 J	12.9 J	49.5 J	24000	0.04	482 J	19.7 JX	16.1	4.6 U	46.9 J	NR
32-001-WR1	0.6 JX	250 J	74.3	0.5 UJ	1.8 U	6.29 J	548 J	14800	0.09	67.4 J	4.3 JX	167	8.4	11.6 J	NR
32-001-WR3	0.6 UJX	175 J	303	0.6 UJ	3.2 J	34.7 J	462 J	79900	0.09	59.3 J	21.9 JX	130	6.7 U	61.9 J	NR
32-001-WR4	0.6 UJX	2590 J	90.5	0.6 UJ	10.3 J	61.0 J	5200 J	45000	0.40	102 J	40.1 JX	48.4	6.7 U	38.2 J	NR
BACKGROUND	0.4 UJX	3.9 UJ	219	0.4 UJ	6.5 J	14.4 J	12.4 J	18900	0.04	442 J	9.4 JX	8.6	4.4 U	33.5 J	NR

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL		SULFUR		SULFATE		PYRITIC		ORGANIC		PYRITIC		SULFUR	
	SULFUR	ACID BASE	NEUTRAL	POTENT	SULFUR	ACID BASE	SULFUR	ACID BASE	SULFUR	ACID BASE	SULFUR	ACID BASE	SULFUR	ACID BASE
	%	U/1000t	U/1000t	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t	%	U/1000t
32-001-WR1	1.09	34.1	-0.55	-35	<0.01	1.16	0.02	0.62	1.16	0.62	0.02	-1.17	0.62	-1.17
32-001-WR3	0.25	7.81	-8.16	-16.0	0.14	0.09	0.02	0.62	0.09	0.62	0.02	-8.78	0.62	-8.78
32-001-WR4	0.99	30.9	-3.43	-34	0.77	0.15	0.07	2.19	0.15	2.19	0.07	-5.61	2.19	-5.61

LEGEND

SE1 - Approximately 30' downstream of WR3.
SE2 - Upstream of the just below confluence with a dry drainage from the east.
WR1 - Composite of subsamples WR1A and 1B.
WR3 - Composite of subsamples WR 3A and 3B.
WR4 - Grab sample of the WR4 subsample.
BACKGROUND - From the Copper Cliff Mine (32-001-SS1).

XRF ANALYSIS RESULTS

**COPPER CLIFF
PA NO. 32-001**

Mine Name: Copper Cliff PA# 32-001
XRF Field Analyses
Results in PPM

XRF SAMPLE I.D.	CrHI	K	Ca	Ti	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Sr
32-001-RUBBLE		24469	4561.18	2067.84			23367.3			853.591	98.4223 *	245.415	97.0582
32-001-SE500		17426.8	6188.96	1806.98			26079.6			1018.95	177.401 *	172.352 *	182.717
32-001-WR1A		21347.2	3719	2282.21			28133.3			1427.36	98.1062 *	715.305	127.418
32-001-WR1B		17509.9	2179.91	2113.83			11270.7				51.8106 *		817.592
32-001-WR1-COMP		20985.8	3065.08	2516.92			22027.1			722.501	79.0363 *	469.561	441.362
32-001-WR2		10282.8	36160.3	1085.83			51331.9			154.611 *	118.492 *	271.875	111.673
32-001-WR3A		21429.9	3166.85	1676.68		620.95 *	91700.5			392.731 *	178.936 *	317.926	184.025
32-001-WR3B		12184.6	1647.84	2301.61			62207.4	651.343 *	167.878 *	234.426 *	215.441 *	219.571 *	129.018
32-001-WR3-COMP		13345	1845.23	2248.78			68968.5	757.705 *		159.047 *	219.282 *	207.543 *	131.052
32-001-WR4		8937.02	26350.4	1100.58		594.389 *	57069.9			5834.83	157.024 *	2171.61	202.993
32-001-WR5		22043	4417.38	2117.17			34084.2			94.3625 *	73.372 *	109.085 *	377.702

XRF SAMPLE I.D.	Zr	Hg	Mo	Pb	Rb	Cd	Sb	Ba	Ag	U	Th
32-001-RUBBLE	297.433				113.715			348.16			22.2975 *
32-001-SE500	259.49			48.7446 *	56.0102 *			522.137			12.3626 *
32-001-WR1A	286.49		8.93651 *		83.1117			340.018			
32-001-WR1B	253.09		28.6287	470.049	34.9864 *			394.352			32.0234 *
32-001-WR1-COMP	292.816		18.8134 *	234.429	65.0322 *			369.789			24.8883 *
32-001-WR2	123.523				44.4705 *			642.409			
32-001-WR3A	172.265				61.1759 *			643.03			
32-001-WR3B	183.916			64.281 *	35.1531 *			583.93			
32-001-WR3-COMP	171.086			76.4202 *	42.1929 *			588.353			
32-001-WR4	141.49				36.0609 *			696.141			
32-001-WR5	295.085			108.592 *	99.6421			591.571			18.2948 *

* = Estimated Quantity

\$ = Unvalidated Data

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**COPPER CLIFF
PA NO. 32-001**

AIMSS SCORESHEET

SITE NAME:
PA NUMBER:

Copper Cliff
32-001

LINE NO.		GROUNDWATER PATHWAY	
1		OBSERVED RELEASE	0
2		EXCEEDENCES	0
3A	GW - LIKELIHOOD OF RELEASE	CONTAINMENT	20
3B		GW DEPTH	20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B 400
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C 400
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 1.076
6	GW - TARGETS	WELLS - 1 MI. x 2.5	2.5
7		WELLS - 1 TO 4 MI	81
8		NEAREST WELL	10
9		TARGETS SCORE	LINES 6 + 7 + 8 93.5
10		GROUNDWATER SCORE	LINES 4 x 5 x 9 40242
		SURFACE WATER PATHWAY	
11	SW - LIKELIHOOD OF RELEASE	OBSERVED RELEASE	300
12		EXCEEDENCES	0
13A		CONTAINMENT	20
13B		DISTANCE TO SW	2
13C		POTENTIAL TO RELEASE	LINES 13A x 13B 40
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C 340
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 1.209
16	SW - TARGETS	DRINKING WATER POP'N	0
17		IMPACTED DRAINAGE	0
18		WETLANDS	10
19		FISHERY	0
20		RECREATION	5
21		IRRIGATION/STOCK	2
22		T & E SPECIES HABITAT	5
23		TARGETS SCORE	SUM LINES 16 THRU 22 22
24		SURFACE WATER SCORE	LINES 14 x 15 x 23 9043
		AIR PATHWAY	
25	AIR - LIKELIHOOD OF RELEASE	OBSERVED RELEASE	0
26A		CONTAINMENT	5
26B		DISTANCE TO POPULATION	5
26C		POTENTIAL TO RELEASE	LINES 26A x 26B 25
27		LIKELIHOOD SCORE	LINES 25 + 26C 25
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 0.082
29	AIR - TARGETS	POPULATION - 4 MILES	10
30		NEAREST RESIDENCE	0
31		WETLANDS	10
32		PARKS / WILDERNESS	0
33		T & E SPECIES HABITAT	5
34		TARGETS SCORE	SUM LINES 29 THRU 33 25
35		AIR PATHWAY SCORE	LINES 27 x 28 x 34 51
		DIRECT CONTACT PATHWAY	
36	LIKELIHOOD OF EXPOSURE	OBSERVED EXPOSURE	50
37A		ACCESSIBILITY	20
37B		DISTANCE TO POPULATION	5
37C		POTENTIAL EXPOSURE	LINES 37A x 37B 100
38		LIKELIHOOD SCORE	LINES 36 + 37C 150
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 0.071
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE	1
41		NEAREST RESIDENCE	0
42		RECREATIONAL USE	5
43		TARGETS SCORE	SUM LINES 40 THRU 42 6
44		DIRECT CONTACT SCORE	LINES 38 x 39 x 43 64
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE (LINES 10 + 24 + 35 + 44) / 100,000		0.49

SITE NAME:
PA NUMBER:

Copper Cliff
32-001

LINE
NO.

SITE SAFETY

1	THREAT	ACCESSIBILITY		20
2		OPEN SHAFTS	100 EA.	0
3		OPEN ADITS	50 EA.	0
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	75
5		HAZ. STRUCTURES	40 EA.	40
6		EXPLOSIVES		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 THRU 7	115
9		POPULATION - 1 MILE		1
10	TARGETS	NEAREST RESIDENCE		0
11		RECREATIONAL USE		5
12		TARGETS SCORE	SUM LINES 9 THRU 11	6
13		SITE SAFETY SCORE	(LINES 1 x 8 x 12) / 1,000	13.80

**SUMMARY OF HISTORICAL ANALYTICAL DATA
FROM OTHER SOURCES**

STATE HEALTH DEPT.

WATER QUALITY BUREAU

HELENA, MONTANA 59601

STATE MONTANA

COUNTY MISSOULA

LAT.-LONG. 464659N 1132715W

SAMPLE LOCATION 12N 15W 11E8A

STATION CODE

ANALYSIS NUMBER 80W2408

DATE SAMPLED 10-09-80

DRAINAGE BASIN 076F -BLACKFOOT

TIME SAMPLED 1430

WATER FLOW RATE 2.0 CFS(E)

METHOD SAMPLED GRAB

FLOW MEASUREMENT METHOD NOT MEASURED

SAMPLE SOURCE STREAM

ALTITUDE OF LAND SURFACE

WATER USE MULTIPLE

TOTAL WELL DEPTH BELOW LS

AQUIFER(S)

S/L ABOVE(+) OR BELOW LS

SAMPLED BY WQBH

SAMPLE DEPTH BELOW SURFACE

SAMPLING SITE: UNION CR BELOW COPPER CLIFF ADIT 0.4 MI.

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	47.2	2.355	BICARBONATE(HCO3)	176.9	2.899
MAGNESIUM (MG)	13.2	1.086	CARBONATE (CO3)	0.0	0.0
SODIUM (NA)			CHLORIDE (CL)		
POTASSIUM (K)			SULFATE (SO4)	27.8	0.579
			FLUORIDE (F)		
			PHOSPHATE(PC4 AS P)		
			NO3+NO2 (TOT AS N)		

SUM CATIONS 60.4 3.441

SUM ANIONS 204.7 3.478

LABORATORY PH

TOT HARDNESS(MG/L-CAC03) 172

LD WATER TEMPERATURE (C) 6.6

TOT ALKALINITY(MG/L-CAC03) 145

SUM-DISS. IONS MEAS.(MG/L)

LABORATORY TURBIDITY (NTU) 0.4

LAB CONDUCTIVITY-UMHOS-25C

SODIUM ADSORPTION RATIO

ADDITIONAL

SEDIMENT,TOT,SUSP (MG/L)< 2.9

CADMIUM, TR (MG/L AS CD) < .005

LEAD,TR (MG/L AS PB) < .05

MERCURY, TR (MG/L AS HG) < .0002

PH.FIELD(SU) 7.8

COPPER, DISS(MG/L AS CU) < 0.01

LEAD, DISS(MG/L AS PB) < 0.05

PARAMETERS

ARSENIC,TR (MG/L AS AS) .002

COPPER,TR (MG/L AS CU) < .01

ZINC,TR (MG/L AS ZN) < .005

IRON,TR (MG/L AS FE) .03

ZINC, DISS(MG/L AS ZN) .005

IRON,FERROUS,DISS (MG/L) .02

CADMIUM,DISS(MG/L AS CD) < 0.005

REMARKS: SURV. MON.

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVLENTS PER LITER

ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED. TOT=TOTAL SUSP=SUSPENDED

M=MEASURED(R)=REPORTED (E)=ESTIMATED M=METERS TR=TOTAL RECOVERABLE

SAMPLE NO SAMPLER ROB HANDLING 4210 ANALYST DE LAB WQBH

COMPLETED 12-08-80 COMPUTER RUN 12/15/80 DATA 0975/PROG 0876 FUND 6250

TND DEV. ION BALANCE 0.26 CA MG NA K CL SO4 HCO3 CO3 NO3

SEGMENT MPDES 68.4 31.6 0.0 0.0 0.0 16.6 83.4 0.0 0.0

ALC. MEQ/L= INSUFFICIENT DATA 80W2408

STATE HEALTH DEPT.

WATER QUALITY BUREAU

HELENA, MONTANA 59601

STATE	MONTANA	COUNTY	MISSOULA
LAT.-LONG.	464840N 1132656W	SAMPLE LOCATION	12N 15W 11800
STATION CODE		ANALYSIS NUMBER	80W2407
DATE SAMPLED	10-09-80	DRAINAGE BASIN	076F -BLACKFOOT
TIME SAMPLED	1400	WATER FLOW RATE	1.0 CFS(E)
METHOD SAMPLED	GRAB	FLOW MEASUREMENT METHOD	NOT MEASURED
SAMPLE SOURCE	STREAM	ALTITUDE OF LAND SURFACE	
WATER USE	MULTIPLE	TOTAL WELL DEPTH BELOW LS	
AQUIFER(S)		SWL ABOVE(+) OR BELOW LS	
SAMPLED BY	WQ3H	SAMPLE DEPTH BELOW SURFACE	

SAMPLING SITE: UNION CR ABOVE COPPER CLIFF ADIT

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	47.6	2.375	BICARBONATE(HCO3)	191.5	3.139
MAGNESIUM (MG)	13.2	1.086	CARBONATE (CO3)	0.0	0.0
SODIUM (NA)			CHLORIDE (CL)		
POTASSIUM (K)			SULFATE (SO4)	22.6	0.471
			FLUORIDE (F)		
			PHOSPHATE(PO4 AS P)		
			NO3+NO2 (TOT AS N)		

SUM CATIONS	60.8	3.461	SUM ANIONS	214.1	3.610
-------------	------	-------	------------	-------	-------

LABORATORY PH		TOT HARDNESS(MG/L-CACO3)	173
FIELD WATER TEMPERATURE (C)	6.1	TOT ALKALINITY(MG/L-CACO3)	157
SUM-DISS. IONS MEAS.(MG/L)		LABORATORY TURBIDITY (NTU)	0.4
LAB CONDUCTIVITY-UMHQS-25C		SODIUM ADSORPTION RATIO	

A D D I T I O N A L		P A R A M E T E R S	
SEDIMENT,TOT,SUSP (MG/L)<	2.7	ARSENIC,TR (MG/L AS AS)	.002
CADMIUM, TR (MG/L AS CD)	< .005	COPPER,TR (MG/L AS CU)	< .01
LEAD,TR (MG/L AS PB)	< .05	ZINC,TR (MG/L AS ZN)	< .005
MERCURY, TR (MG/L AS HG)	< .0002	IRON,TR (MG/L AS FE)	.12
PH,FIELD(SU)	8.1	ZINC, DISS(MG/L AS ZN)	.005
COPPER, DISS(MG/L AS CU)	< 0.01	IRON,FERROUS,DISS (MG/L)	.01
LEAD, DISS(MG/L AS PB)	< 0.05	CADMIUM,DISS(MG/L AS CD)	< 0.005

REMARKS: SURV. MON.

EXPLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
 ALL CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED. TOT=TOTAL SUSP=SUSPENDED
 (M)=MEASURED(R)=REPORTED (E)=ESTIMATED M=METERS TR=TOTAL RECOVERABLE

SAMPLE NO	SAMPLER	ROB	HANDLING	4210	ANALYST	DE	LAB	WQBH
COMPLETED	12-08-80	COMPUTER RUN	12/15/80	DATA	0975/PROG	0876	FUND	6250
STND DEV.	ION BALANCE	1.03	CA	MG	NA	K	CL	SU4
SEGMENT	MPDES	68.6	31.4	0.0	0.0	0.0	13.0	87.0
ALC.	MEQ/L=	INSUFFICIENT DATA						80W2407

STATE HEALTH DEPT.

WATER QUALITY BUREAU

HELENA, MONTANA 59601

STATE MONTANA
 LAT.-LONG. 464846N 1132656W
 STATION CODE
 DATE SAMPLED 10-09-80
 TIME SAMPLED 1330
 METHOD SAMPLED GRAB
 SAMPLE SOURCE MINE DRAIN
 WATER USE MULTIPLE
 AQUIFER(S)
 SAMPLED BY WQBH

COUNTY MISSOULA
 SAMPLE LOCATION 12N 15W 116DA
 ANALYSIS NUMBER 80W2406
 DRAINAGE BASIN 076F -BLACKFOOT
 WATER FLOW RATE 25. GPM(E)
 FLOW MEASUREMENT METHOD NOT MEASURED
 ALTITUDE OF LAND SURFACE
 TOTAL WELL DEPTH BELOW LS
 SWL ABOVE(+) OR BELOW LS
 SAMPLE DEPTH BELOW SURFACE

SAMPLING SITE: COPPER CLIFF MINE ADIT

	MG/L	MEQ/L		MG/L	MEQ/L
CALCIUM (CA)	30.5	1.522	BICARBONATE(HCO3)	37.8	0.620
MAGNESIUM (MG)	15.4	1.267	CARBONATE (CO3)	0.0	0.0
SODIUM (NA)			CHLORIDE (CL)		
POTASSIUM (K)			SULFATE (SO4)	113.7	2.367
			FLUORIDE (F)		
			PHOSPHATE(PO4 AS P)		
			NO3+NO2 (TOT AS N)		
SUM CATIONS	45.9	2.789	SUM ANIONS	151.5	2.987

LABORATORY PH
 FIELD WATER TEMPERATURE (C)
 SUM-DISS. IONS MEAS.(MG/L)
 L CONDUCTIVITY-UMHUS-25C

7.5

TOT HARDNESS(MG/L-CACO3) 140
 TOT ALKALINITY(MG/L-CACO3) 31
 LABORATORY TURBIDITY (NTU) 49.
 SODIUM ADSORPTION RATIO

A D D I T I O N A L

SEDIMENT, TOT, SUSP (MG/L) 19.3
 CADMIUM, TR (MG/L AS CD) < .005
 LEAD, TR (MG/L AS PB) < .05
 MERCURY, TR (MG/L AS HG) < .0002
 PH, FIELD(SU) 6.6
 COPPER, DISS(MG/L AS CU) < 0.01
 LEAD, DISS(MG/L AS PB) < 0.05

P A R A M E T E R S
 ARSENIC, TR (MG/L AS AS) .021
 COPPER, TR (MG/L AS CU) .06
 ZINC, TR (MG/L AS ZN) .04
 IRON, TR (MG/L AS FE) 19.30
 ZINC, DISS(MG/L AS ZN) .06
 IRON, FERROUS, DISS (MG/L) 9.60
 CADMIUM, DISS(MG/L AS CD) < 0.005

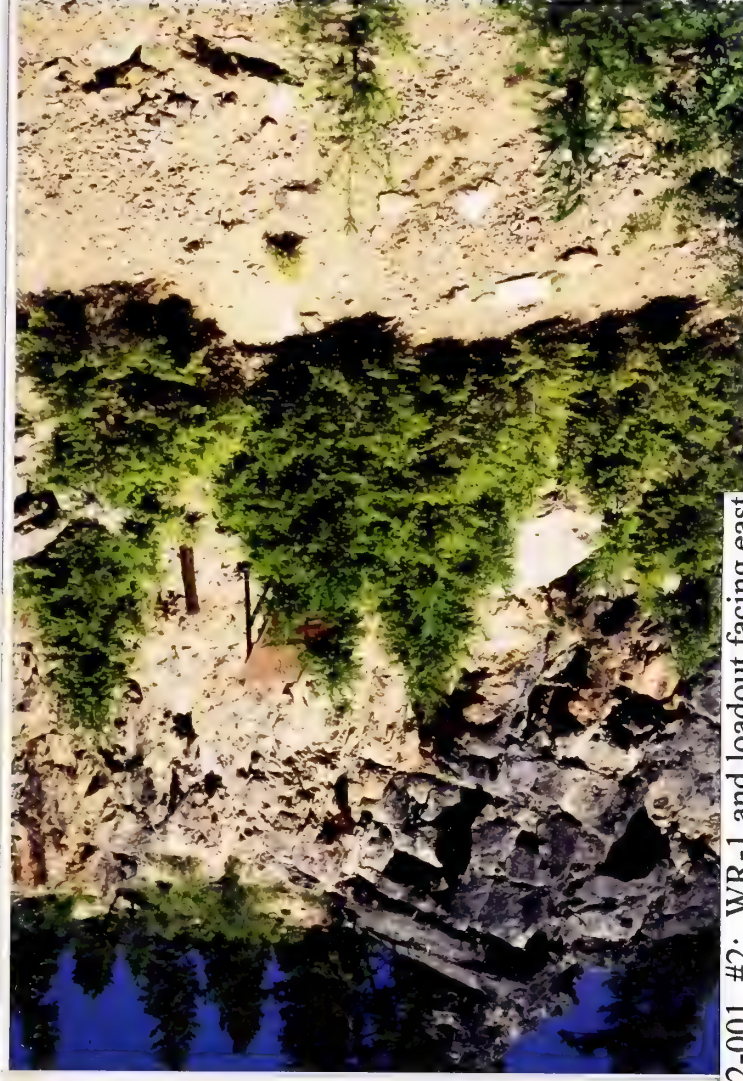
MARKS: SURV. MONITOR

PLANATION: MG/L=MILLIGRAMS PER LITER MEQ/L=MILLIEQUIVALENTS PER LITER
 L CONSTITUENTS DISSOLVED (DISS) EXCEPT AS NOTED. TOT=TOTAL SUSP=SUSPENDED
)=MEASURED(R)=REPORTED (E)=ESTIMATED M=METERS TR=TOTAL RECOVERABLE

MPLE NO SAMPLER ROB HANDLING 4210 ANALYST DE LAB WQBH
 MP TED 12-08-80 COMPUTER RUN 12/15/80 DATA 0975/PRG 0976 FUND 6250
 NO DEV. ION BALANCE 1.47 CA MG NA K CL SO4 HCO3 CO3 NO3
 GMENT MPDES 54.6 45.4 0.0 0.0 0.0 79.2 20.8 0.0 0.0
 C. MEQ/L= INSUFFICIENT DATA 80W2406



32-001, #1: Collapsed shaft



32-001, #2: WR-1 and loadout facing east



32-001, #3: WR-3



32-001, #4: WR-4 facing west



32-001, #5: WR-5 facing west



32-001, #6: SE-2 sample location and base of WR-5 facing west



32-001, #25: SE-2 sample location



32-001, #26: SE-1 sample location

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: FROGS DINER PA#: 32-027

Date: June 28, 1994 Time: 1325-1700

Field Team Leader: Bisch, Pioneer

Sampling Personnel: Flammang, Clark, West; Pioneer

Visitors: None

Weather/Seasonality Observations: Sunny; warm (approx. 75°F).

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #7: SW-1 sample location facing southeast; #8: SW-2 sample location facing southeast; #9: Adit #1, GW-1 sample location; #10: WR-1 facing south. Video Tape No. 1

General Comments/Observations (not covered specifically in attached Inventory Forms): Site is located near Copper Cliff site (32-001); approx. 300 feet downstream from the mouth of the drainage which contains the Copper Cliff site.

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Remove or isolate WR-1 from Union Creek floodplain and stabilize dump.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): FROGS DINER PA#: 32-027

Legal Description: T 12N ; R 15W ; Sec. 11 , SE 1/4 NW 1/4 1/4

County: MISSOULA Mining District: COPPER CLIFF

Latitude: N 46° 48' 44" Longitude: W 113° 27' 00"

Primary Drainage Basin and Code: Union Creek/17010203

Secondary Drainage Basin: Union Creek

USGS Quadrangle map name(s): Union Peak

Mine Type/Commodities: Hardrock/Unknown

Activity Status: Active , Inactive/Exploration , Abandoned X .

Ownership: Known Y N X ; private/public? Private

Owner, Agent, or Contact (Include address and phone when available): Unknown

Relationship to other mines/sites in the area/district: Unknown

Regulatory Status (Activity by other agencies)? Hardrock permits?
Past Reclamation Activities? N/A

General site features: Elevation 4600' , Slope 10° ,
Aspect Northeast

Land use: Mining , Recreational X , Residential , Urban ,
Agricultural , Other(Specify)

Area of disturbed/unvegetated lands? 0.5 acre(s) .

Site Dimensions: 150 feet x 125 feet

Predominant vegetation types: Alder, willow, Douglas fir

Access: roads - good (paved) , poor (maintained dirt road) ,
4wd X , trail .

Other logistical considerations (proximity to other sites). Locked gate on Union Creek Road, 1+ mile below site; access site from Cramer Creek Road (good) or Tenmile Road (not as good).

Well logs within 1 mile radius; (Attach MBMG Well Log Printout(s): There is 1
well reported within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also
note presence of radioactive minerals). Site lies on west side of perennial Union
Creek. Union Creek flows north-northwest past the toe of WR-1.
The site is underlain by Precambrian quartzite. Union Creek flows
into the Blackfoot River approximately 11 miles northwest of site.

Mining/milling history, ore type/tenor, host rock, gangue:
Quartzite is present as float and bedrock on the site. No other
information available. Literature cites that the Copper Cliff
district are a group of ancient sandstones, shales, and Cambrian
limestone.

Mine Operation?

Shafts - Yes___, No X, # ___ , Comment _____
Adits - Yes X, No___, # 1 , Comment Discharging; collapsed
Pits - Yes___, No X, # ___ , Comment _____
Placers - Yes___, No X, # ___ , Comment _____
Other - Yes___, No X, # ___ , Comment _____

Mill Operation? Yes___, No X. If yes answer the next three
questions:

Period(s) of Operation: N/A

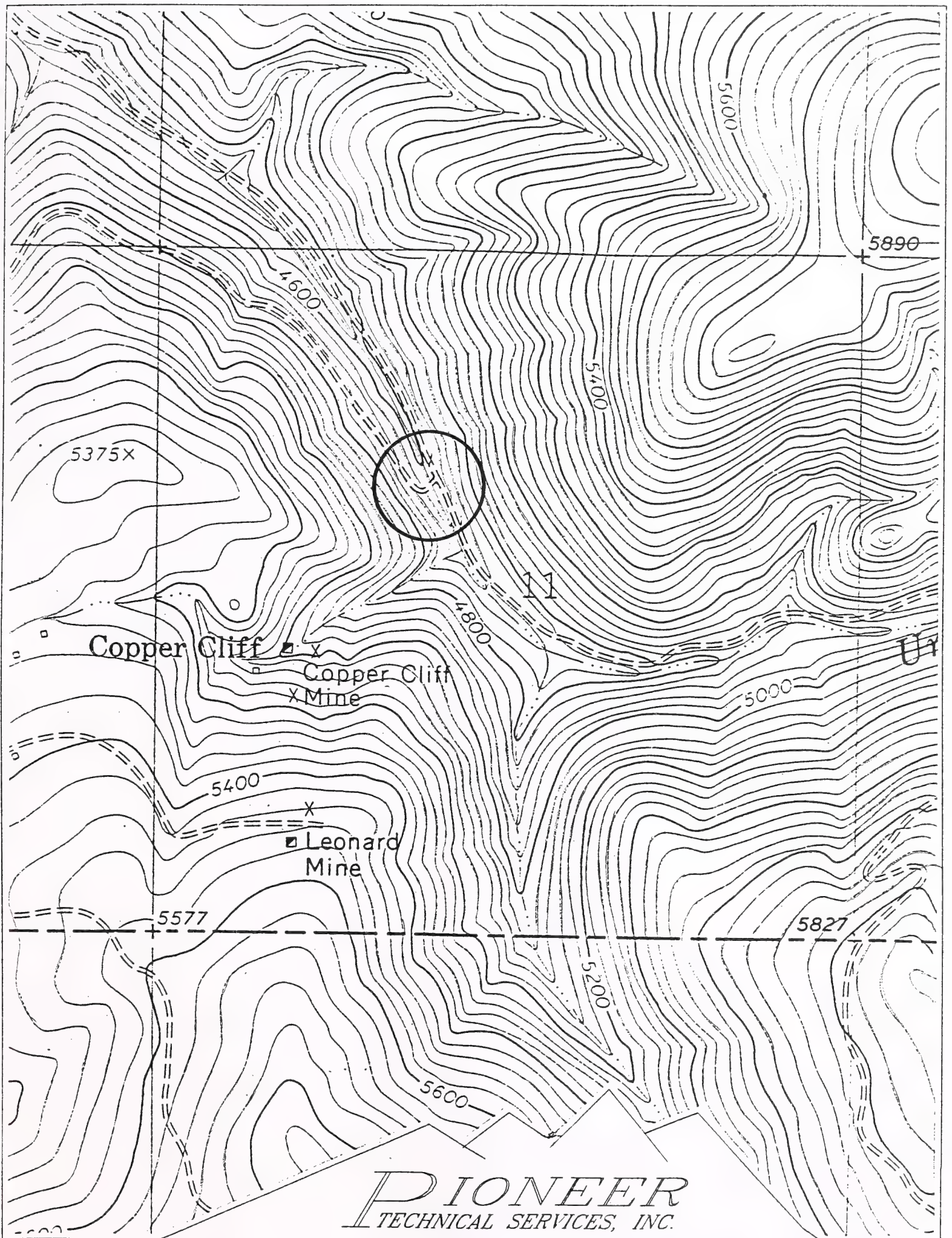
Origin of Ore Milled - Custom Mill___ Dedicated Mill___; Number and
names of mines that supplied mill feed: N/A

Process? Hg-amalgam, CN leach (vat, heap), floatation, smelting?
N/A

Montana Bureau of Mines and Geology
Water Well Log Data

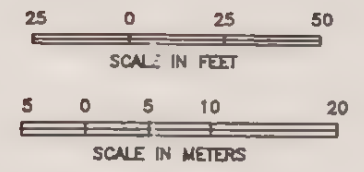
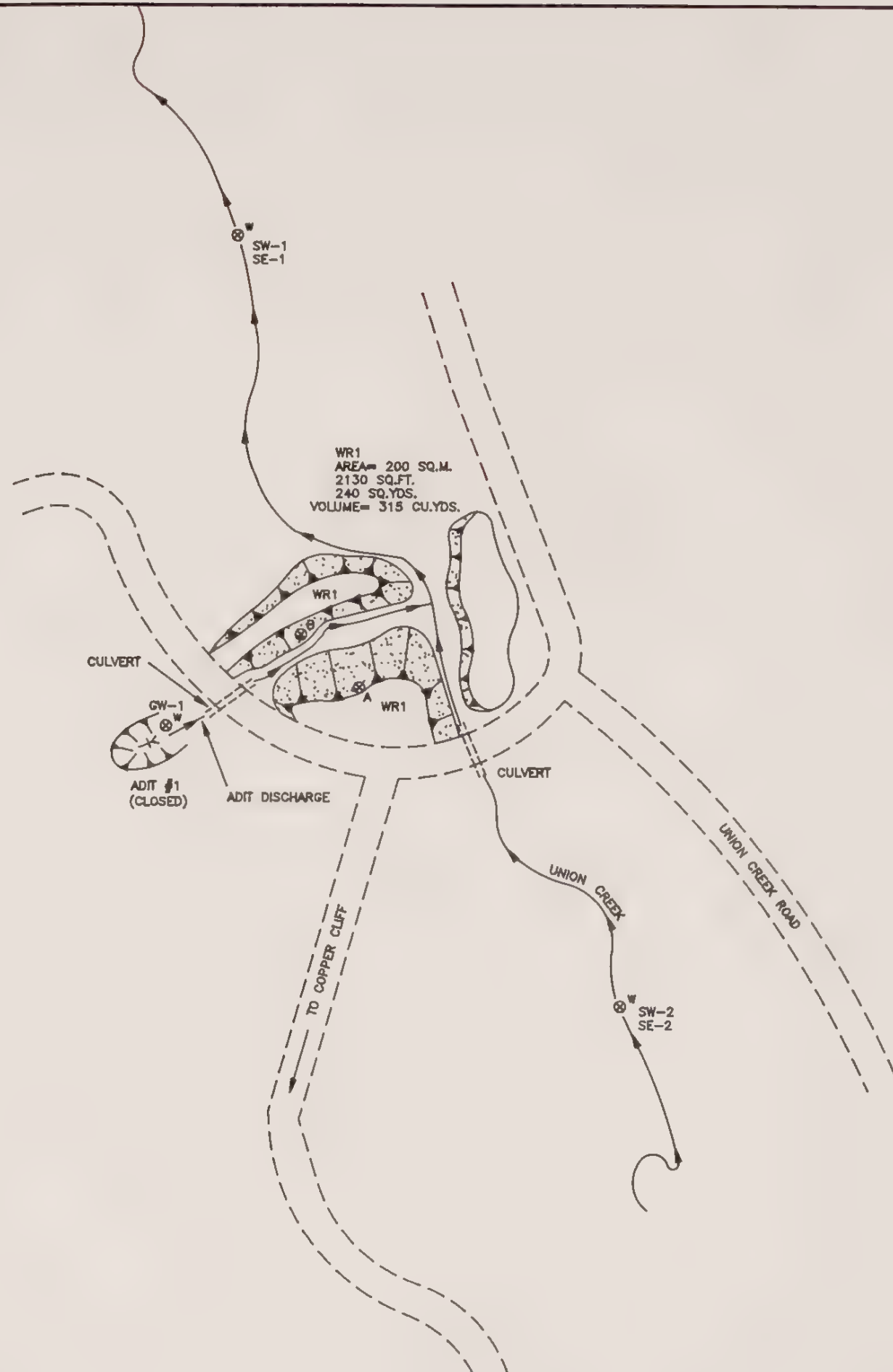
08/12/1994

Well No.	Location	Depth	Yield	Static Water Level
66507	12N 15W 12 DD	50.0	40.0	17.00



PIONEER
TECHNICAL SERVICES, INC.

FROGS DINER, P.A. NO. 32-027
T12N, R15W, SECTION 11
SCALE: 1" = 1000'



LEGEND

- ⊗ XRF SAMPLE
- ⊗^w WATER SAMPLE GROUND AND SURFACE
- OPEN ADIT
- +— CLOSED ADIT
- DRAINAGE
- UNIMPROVED ROAD
- === CULVERT
- ▲ SLOPE DIRECTION
- ⬢ WASTE ROCK DUMP OR TAILINGS PILE

DRAWN FOR: PIONEER TECHNICAL SERVICES, INC.	TITLE: FROG'S DINER PA# 32-027
	DRAWING NO.: PT340204 REV: -- DATE: 11/29/94 PLOT SCALE: 1" = 15'

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): N/A

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): N/A

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): N/A

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): N/A

Comments on potential for mitigation: N/A

SAMPLERS: Bisch

[illegible]

D-Direct reading (Kalway Meter) ; S-Saturated Paste (Orion Meter)

Comments or deviations from SOPs: 32-027-WR-1 is composite of WR-1A and -1B. See Copper Cliff (32-001) for background soil sample.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes X, No , Number: 1 Identification: Adit #1

Filled shafts: Yes , No X, Number: Identification:

Seeps/Springs: Yes , No X, Number: Identification:

Groundwater wells within 4 miles?: Yes X, No ;

Number of well logs: 82

Distance to nearest well used for drinking:

 <1,000 ft; 1,000 ft to 0.5 miles; X >0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite , Probable , Possible , Unlikely X.

Shallow alluvial groundwater may be in contact with uncontained WR-1;
WR-1 contains metal values slightly above background levels.

Approximate Depth to Groundwater: X <25 ft; 25 - 100 ft; >100 ft.

Other observations/notes: Discharging adit flows into Union Creek after
flowing through culvert and 30 feet across WR-1.

SAMPLERS: Bisch

NOTES: Estimated (E) from edit, shaft, seep or springs

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes X, No , Name(s): Union Creek

Dry streambeds: Yes , No X, Name(s):

Other surface water: Yes , No X, Name(s)/Description:

Waste materials within any floodplain: Yes X, No Source ID(s): WR-1 is in floodplain of Union Creek; toe of dump is being eroded by stream.

Approximate Flood frequency? X 1 yr, 10 yr, 100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? 1 cfs

High Flow: 10 cfs, Average Flow: 1 cfs

Distance between waste source(s) and nearest surface water body (ft)? 0 feet

Surface water draining onto or through waste sources: Yes X, No , Describe: Adit discharge flows across WR-1. Union Creek flows at toe of WR-1.

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?) Agriculture, irrigation; Blackfoot River has recreation, fishery, wetlands, irrigation, and agriculture.

Observed erosional/sedimentation/stream turbidity problems? Yes X, No . Distance downstream (ft)? 0-500 X; 500-1,000 ; >1,000 . Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): Iron-staining is visible in Union Creek for 200 feet downstream of adit discharge.

SURFACE WATER INVENTORY FORM

SAMPLERS: Flammang

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SAMPLE LOCATION	PH	SC μS/cm @ 25°C	Temp °C	ALK. mg/L as CaCO ₃	Flow cfs/gpm	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
SW-1	SW	75' downstream from confluence with adit discharge in Union Creek	6.17	252	20.4	86	1 cfs (M)	32-027-SW-1	06/28/94 1400	T-Metals, TDS, Hardness, Cl, SO ₄ , NO ₂ /NO ₃
SE-1	SE	75' downstream from confluence with adit discharge in Union Creek	N/A	N/A	N/A	N/A	N/A	32-027-SE-1	06/28/94 1400	T-Metals
SW-2	SW	50' upstream from road crossing in Union Creek	6.12	250	19.9	101	0.74 cfs (M)	32-027-SW-2	06/28/94 1430	T-Metals, TDS, Hardness, Cl, SO ₄ , NO ₂ /NO ₃
SE-2	SE	50' upstream from road crossing in Union Creek	N/A	N/A	N/A	N/A	N/A	32-027-SE-2	06/28/94 1430	T-Metals
SE-500	SE	500' downstream of SE- 1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	XRF Analysis
SE-1000	SE	1,000' downstream of SE-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	XRF Analysis

FLOW: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO₃)

Presence of evaporative salt deposits? (ESD)

Discolored or turbid seepage? (SPG)

Presence of long filamentous algae in drainages, mosses in moist areas?

Presence of ferric hydroxide precipitates? (FEOX)

Presence of burned or stressed vegetation? (VEG)

$pH \leq 5.0$ (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? None

Wetlands present: Yes____, No X, Describe:_____

Carbonate rocks/soils: Yes X, No , Describe: Literature cites that the rocks of the Copper Cliff district are a group of ancient sandstones, shales, and Cambrian limestone.

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10___; 10-30 X; 30-100___;
100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or
greater___; Comments_____

Nearest residence: <1,000 ft; 1,000 ft - 0.5 miles; X >0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:

observed high moderate low none

SAMPLERS: Bisch

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X,
Describe: _____

Population within 1 mile: 1-10 X; 10-30____; 30-100____; 100-300____;
300-1,000____; 1,000-3,000____; 3,000-10,000____; 10,000 or greater____;
Comments _____

Evidence of recreational use on site: Yes X, No____, Describe: Vehicle
tracks on roads

Accessibility (check each that apply): X Easily accessible - no fences,
gates, or warning signs; _____ Moderately Accessible - barbed wire fences,
road gated, or signs posted; _____ Difficult Access - chain-link fence,
road gated and locked, site guarded (does not include locked or manned
access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes____, No X, Comment _____

Wilderness Area - Yes____, No X, Comment _____

T&E Species Habitat - Yes X, No____, Comment Bald Eagle;
Peregrine Falcon

Bat Habitat - Yes____, No X, Comment _____

Primary Drainage X; Secondary Drainage____; No Information____:

Riparian Habitat Quality - High____, Medium X, Low____

Wetlands Frontage - High____, Medium X, Low____

Fisheries Habitat and Species Classification - Not Rated

Sport Fishery Classification - Not Rated

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes____, No X, Number____, types and locations:____

Hazardous structures: Yes____, No X, Number____, types and locations:____

Unstable highwalls, pits, trenches, slopes: Yes____, No X, Number____,
types and locations:____

Unstable waste piles, impoundments, undercut banks: Yes X, No____,
Number 1, types and locations: WR-1 is very steep and eroding into
stream.

Fire and/or Explosion hazards: Yes____, No X, Explain:____

Bibliography

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0,
Prepared by Montana Natural Resource Information System, December
1989.

MDSL/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for
Frogs Diner, Prepared by Northern Engineering and Testing,
September 22, 1987.

USGS, Topographic Map, Union Peak, Montana, 7 1/2 minute Quadrangle,
1965.

LABORATORY ANALYTICAL DATA

**FROGS DINER
PA NO. 32-027**

Frogs Diner PA# 32-027
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - BISCH
INVESTIGATION DATE: 06/28/94

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	Ag (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
32-027-SE1	1.4 JX	53.3 J	166	0.5 UJ	15.8 J	22.2 J	203 J	24300	0.04	365 J	33.9 JX	24.1	5.2 U	63.3 J	NR
32-027-SE2	2.0 JX	74.4 J	167	0.5 UJ	38.1 J	17.7 J	281 J	18800	0.03	416 J	38.4 JX	22.7	7.1	62.9 J	NR
32-027-WR1	0.5 UJX	129 J	138	0.5 UJ	37.0 J	6.2 J	203 J	59300	0.70	556 J	36.1 JX	34.7	5.5 U	66.0 J	NR
BACKGROUND	0.4 UJX	3.9 UJ	219	0.4 UJ	6.5	14.4 J	12.4 J	18900	0.04	442 J	9.4 JX	8.6	4.4 U	33.5 J	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR		NEUTRAL POTENT.		SULFUR ACID BASE		PYRITIC SULFUR		ORGANIC SULFUR		PYRITIC SULFUR		SULFUR ACID BASE		SULFUR POTENT.	
	%	1/1000t	%	1/1000t	%	1/1000t	%	1/1000t	%	1/1000t	%	1/1000t	%	1/1000t	%	1/1000t
32-027-WR1	0.84	26.2	-2.92	-29	0.17	0.08	0.59	2.50	-5.42							

WATER MATRIX ANALYSES

Metals in Water
Results in ug/L

FIELD ID	Ag	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
32-027-GW1	0.12 U	20.2 JX	12.4	2.6 U	12.2	4.7 U	12.5	14200	0.11 U	273	25.3	1.1 U	29.4 U	21.3 J	136
32-027-SW1	0.12 U	3.2 JX	97.3	2.6 U	8.7 U	4.7 U	6.8	472	0.11 U	13.2	12.4	1.1 U	29.4 U	5.6 J	138
32-027-SW2	0.12 U	1.3 UX	98.6	2.6 U	8.7 U	4.7 U	5.9	94.8	0.11 U	6.13	8.0 U	1.1 U	29.4 U	4.5 U	135

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Wet Chemistry
Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
32-027-GW1	171	<5.0	89	<0.05	NR
32-027-SW1	155	<5.0	17	0.05	NR
32-027-SW2	155	<5.0	14	0.07	NR

LEGEND

SE1 - 75' downstream in Union Creek from confluence with acid discharge.
SE2 - 50' upstream in Union Creek from road crossing.
WR1 - Composite of subsamples WR1A and 1B.
BACKGROUND - From the Copper Cliff Mine (32-001-SS1).
GW1 - Acid #1 discharge.
SW1 - Same as sample 32-027-SE1.
SW2 - Same as sample 32-027-SE2.

XRF ANALYSIS RESULTS

**FROGS DINER
PA NO. 32-027**

Mine Name: Frogs Diner PA# 32-027
XRF Field Analyses
Results In PPM

XRF SAMPLE I.D.	CrHI	K	Ca	Ti	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Sr
32-027-SE1000		14746.4	6352.85	1399.87		788.368 *	21929.5			128.908 *	133.588 *	102.08 *	235.077
32-027-SE500		8266.16	6704.33	920.135		1124.38 *	20793.1			314.788 *	105.198 *	68.3284 *	215.677
32-027-WR1A		16223.1	1184.04	1285.38			24579.9				77.678 *	152.222 *	135.893
32-027-WR1B		19435.1	2753.82	1723.72		3145.25	140304			918.977 *	278.587 *	380.36	92.6334
32-027-WR1-COMP		21246	2808.83	1631.52		2275.76 *	135529			295.588 *	241.439 *	365.547	126.215
XRF SAMPLE I.D.	Zr	Hg	Mo	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th	
32-027-SE1000	269.197				80.828				482.642			12.781 *	
32-027-SE500	208.968				84.6018				568.041		17.6787 *	13.9716 *	
32-027-WR1A	222.003		9.05247 *	92.7697 *					512.626				
32-027-WR1B	279.554				148.192				352.194				
32-027-WR1-COMP	323.763		14.1902 *		141.301				558.551			9.94032 *	

* = Estimated Quantity

\$ = Unvalidated Data

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**FROGS DINER
PA NO. 32-027**

AIMSS SCORESHEET

SITE NAME:
PA NUMBER:

Frogs Diner
32-027

LINE NO.		GROUNDWATER PATHWAY	
1		OBSERVED RELEASE	0
2		EXCEEDENCES	0
3A	GW - LIKELIHOOD OF RELEASE	CONTAINMENT	20
3B		GW DEPTH	20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B 400
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C 400
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 0.754
6	GW - TARGETS	WELLS - 1 MI. x 2.5	2.5
7		WELLS - 1 TO 4 MI	81
8		NEAREST WELL	0
9		TARGETS SCORE	LINES 6 + 7 + 8 83.5
10		GROUNDWATER SCORE	LINES 4 x 5 x 9 25184
SURFACE WATER PATHWAY			
11		OBSERVED RELEASE	300
12	SW - LIKELIHOOD OF RELEASE	EXCEEDENCES	0
13A		CONTAINMENT	20
13B		DISTANCE TO SW	20
13C		POTENTIAL TO RELEASE	LINES 13A x 13B 400
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C 700
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 0.965
16	SW - TARGETS	DRINKING WATER POP'N	0
17		IMPACTED DRAINAGE	0
18		WETLANDS	10
19		FISHERY	0
20		RECREATION	5
21		IRRIGATION/STOCK	2
22		T & E SPECIES HABITAT	0
23		TARGETS SCORE	SUM LINES 16 THRU 22 17
24		SURFACE WATER SCORE	LINES 14 x 15 x 23 11484
AIR PATHWAY			
25		OBSERVED RELEASE	0
26A	AIR - LIKELIHOOD OF RELEASE	CONTAINMENT	5
26B		DISTANCE TO POPULATION	5
26C		POTENTIAL TO RELEASE	LINES 26A x 26B 25
27		LIKELIHOOD SCORE	LINES 25 + 26C 25
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 0.002
29	AIR - TARGETS	POPULATION - 4 MILES	10
30		NEAREST RESIDENCE	0
31		WETLANDS	10
32		PARKS / WILDERNESS	0
33		T & E SPECIES HABITAT	0
34		TARGETS SCORE	SUM LINES 29 THRU 33 20
35		AIR PATHWAY SCORE	LINES 27 x 28 x 34 1
DIRECT CONTACT PATHWAY			
36		OBSERVED EXPOSURE	50
37A	LIKELIHOOD OF EXPOSURE	ACCESSIBILITY	20
37B		DISTANCE TO POPULATION	5
37C		POTENTIAL EXPOSURE	LINES 37A x 37B 100
38		LIKELIHOOD SCORE	LINES 36 + 37C 150
39	D.C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET) 0.002
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE	1
41		NEAREST RESIDENCE	0
42		RECREATIONAL USE	5
43		TARGETS SCORE	SUM LINES 40 THRU 42 6
44		DIRECT CONTACT SCORE	LINES 38 x 39 x 43 2
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE (LINES 10 + 24 + 35 + 44) / 100,000		0.37

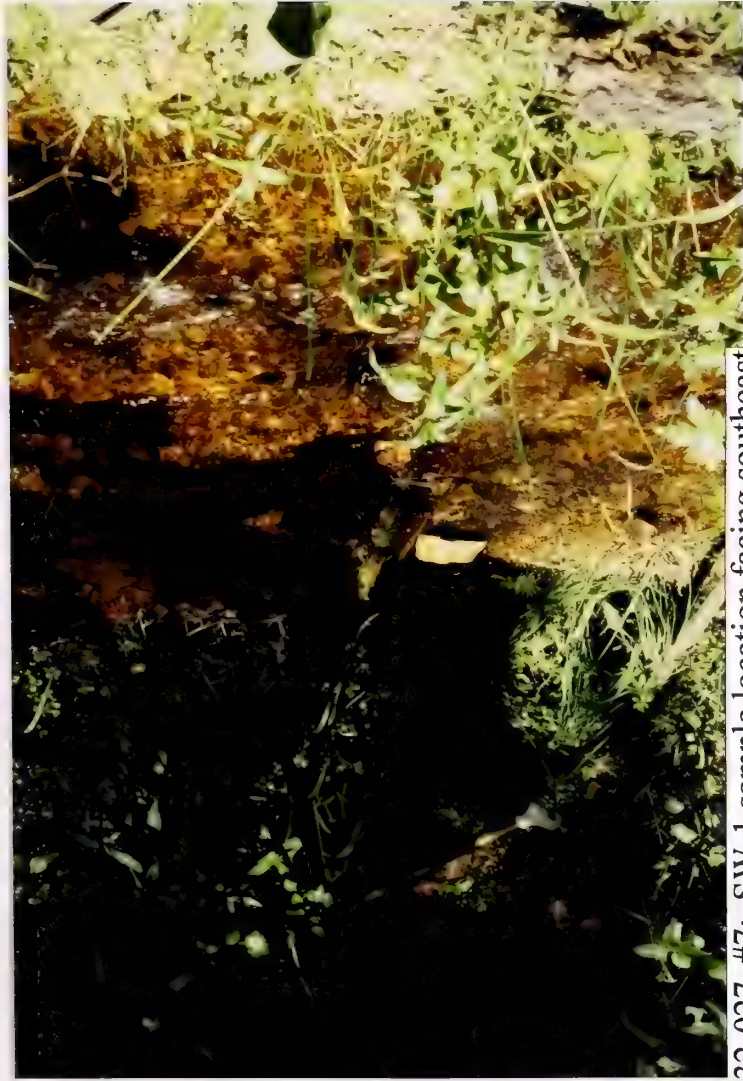
SITE NAME:
PA NUMBER:

Frogs Diner
32-027

LINE
NO.

SITE SAFETY

1	THREAT	ACCESSIBILITY		20
2		OPEN SHAFTS	100 EA.	0
3		OPEN ADITS	50 EA.	0
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	0
5		HAZ. STRUCTURES	40 EA.	0
6		EXPLOSIVES		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 THRU 7	0
9		POPULATION - 1 MILE		1
10	TARGETS	NEAREST RESIDENCE		0
11		RECREATIONAL USE		5
12		TARGETS SCORE	SUM LINES 9 THRU 11	6
13		SITE SAFETY SCORE	(LINES 1 x 8 x 12) / 1,000	0.00



32-027, #7: SW-1 sample location facing southeast



32-027, #8: SW-2 sample location facing southeast



32-027, #9: Adit #1; GW-1 sample location



32-027, #10: WR-1 facing south

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: GREAT REPUBLIC SMELTER PA#: 34-000

Date: August 17, 1994 Time: 1140-1500

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Bisch, West; Pioneer

Visitors: None

Weather/Seasonality Observations: Partly cloudy; warm
(approximately 75°F); westerly breeze; warm, dry summer.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #29: SW-1 sample
location at bridge; #30: East end of slag pile eroding into Woody
Creek; #31: West end of slag pile eroding into Woody Creek; #32:
WR-1 (Note: Residence uphill in background); #33: North half of
slag pile from west; #34: South half of slag pile from west.
Video Tape No. 3

General Comments/Observations (not covered specifically in attached Inventory Forms):
Two residences located relatively close to the site; one to the
south, and one to the west.

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Stabilize
slag wall along creek. Remove "hot" waste rock.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): GREAT REPUBLIC SMELTER PA#: 34-000

Legal Description: T 9S ; R 14E ; Sec. 36 , SW 1/4 NE 1/4 NW 1/4

County: PARK Mining District: NEW WORLD

Latitude: N 45° 00' 59" Longitude: W 109° 56' 13"

Primary Drainage Basin and Code: Soda Butte Creek/10070001

Secondary Drainage Basin: Woody Creek

USGS Quadrangle map name(s): Cooke City

Mine Type/Commodities: Smelter/Gold, Silver, Copper, Lead, Zinc

Activity Status: Active , Inactive/Exploration , Abandoned X .

Ownership: Known Y N X ; private/public? Private/Public

Owner, Agent, or Contact (Include address and phone when available): Unknown;
Gallatin Forest

Relationship to other mines/sites in the area/district: Near Great
Republic Mine (source of ore) and Miller Mountain Mine.

Regulatory Status (Activity by other agencies)? Hardrock permits?
Past Reclamation Activities? N/A

General site features: Elevation 7560' , Slope < 5° ,
Aspect North

Land use: Mining , Recreational X , Residential X , Urban ,
Agricultural , Other (Specify)

Area of disturbed/unvegetated lands? 0.5 acre(s) .

Site Dimensions: 120 feet x 200 feet

Predominant vegetation types: Lodgepole pine, Douglas fir, willow,
clover

Access: roads - good (paved) , poor (maintained dirt road) X ,
4wd , trail .

Other logistical considerations (proximity to other sites).
Located < 1,000 feet south of the main street through Cooke City.

Well logs within 1 mile radius; (Attach MRMG Well Log Printout(s): There are 26 wells reported within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). Site is underlain by alluvium. Site lies in floodplain of Woody Creek, which flows west through the site to confluence with Soda Butte Creek 500 feet below the site. Soda Butte Creek flows west into Yellowstone Park to the Yellowstone River.

Mining/milling history, ore type/tenor, host rock, gangue: Mill was burnt by concerned citizens to prevent local children from coming into harm. In 1882, the Republic Smelter was constructed to process the abundant Great Republic Mine ore.

Mine Operation?

Shafts - Yes___, No X, #___, Comment___
Adits - Yes___, No X, #___, Comment___
Pits - Yes___, No X, #___, Comment___
Placers - Yes___, No X, #___, Comment___
Other - Yes X, No___, #___, Comment Smelter

Mill Operation? Yes X, No___ . If yes answer the next three questions:

Period(s) of Operation: Smelter; unknown (1882 - turn of the century)

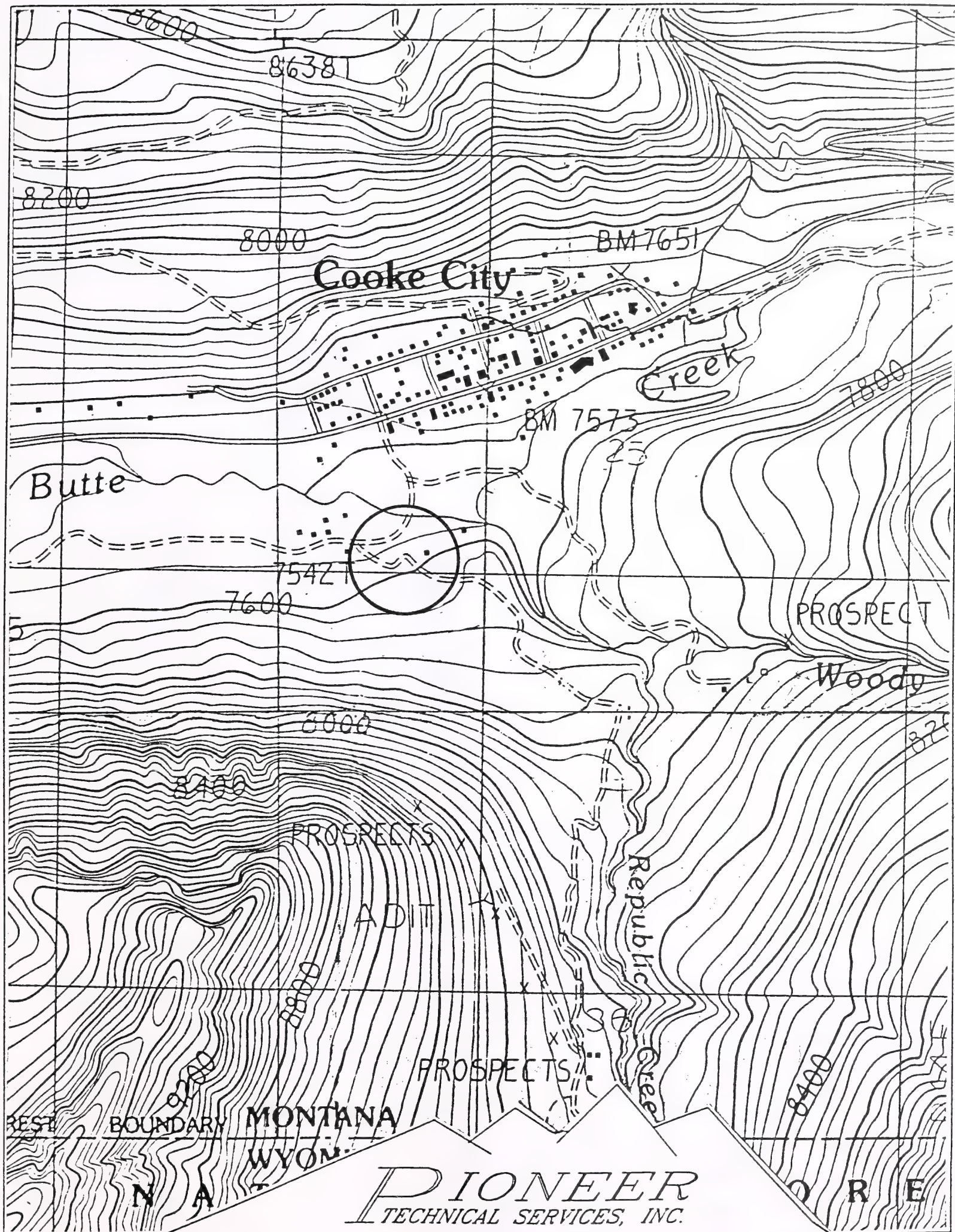
Origin of Ore Milled - Custom Mill X Dedicated Mill___; Number and names of mines that supplied mill feed: Smelted the Great Republic Mine ore and the Miller Mountain ore.

Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting?
Smelting, open roasting, roasting

Montana Bureau of Mines and Geology
Water Well Log Data

08/12/1994

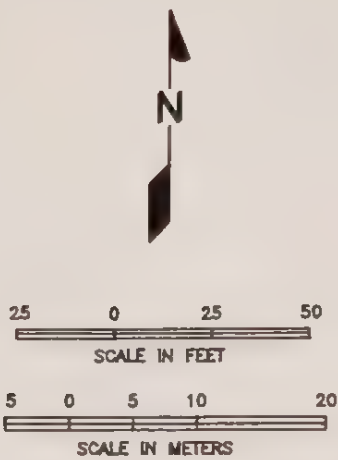
Well No.	Location	Depth	Yield	Static Water Level
106003	09S 14E 25	61.0	0.0	0.00
M:106002	09S 14E 25	180.0	10.0	5.00
M:8297	09S 14E 25 AC	10.0	0.0	4.40
M:8299	09S 14E 25 AC	18.0	0.0	7.10
M:8300	09S 14E 25 AC	21.0	0.0	5.20
M:8298	09S 14E 25 AC	12.0	0.0	10.80
M:8303	09S 14E 25 AC	15.0	0.0	7.10
M:8308	09S 14E 25 ACDA	21.0	0.0	5.40
M:8309	09S 14E 25 ACDA	0.0	0.0	12.40
M:8307	09S 14E 25 ACDA	0.0	0.0	9.20
M:8326	09S 14E 25 ADBD	10.0	0.0	7.20
M:8327	09S 14E 25 ADCA	0.0	0.0	9.80
M:8331	09S 14E 25 ADCB	0.0	0.0	7.30
M:8329	09S 14E 25 ADCB	0.0	0.0	12.60
M:8332	09S 14E 25 ADCC	0.0	0.0	7.80
M:106005	09S 14E 25 B	49.0	40.0	0.00
M:106004	09S 14E 25 B	49.0	40.0	20.00
M:106006	09S 14E 25 BDD	145.0	0.0	0.00
M:121237	09S 14E 25 CBB	71.0	30.0	42.00
M:26187	09S 14E 25 CBB	45.0	60.0	24.00
M:135293	09S 14E 25 CCB	50.0	35.0	31.00
M:138770	09S 14E 25 CCB	50.0	30.0	29.00
M:138883	09S 14E 25 CCB	50.0	35.0	0.00
M:135294	09S 14E 26 CA	100.0	8.0	37.00
M:134028	09S 14E 26 CAA	80.0	30.0	33.00
M:25781	09S 14E 26 DAA	80.0	40.0	46.00



GREAT REPUBLIC SMELTER, P.A. NO. 34-000

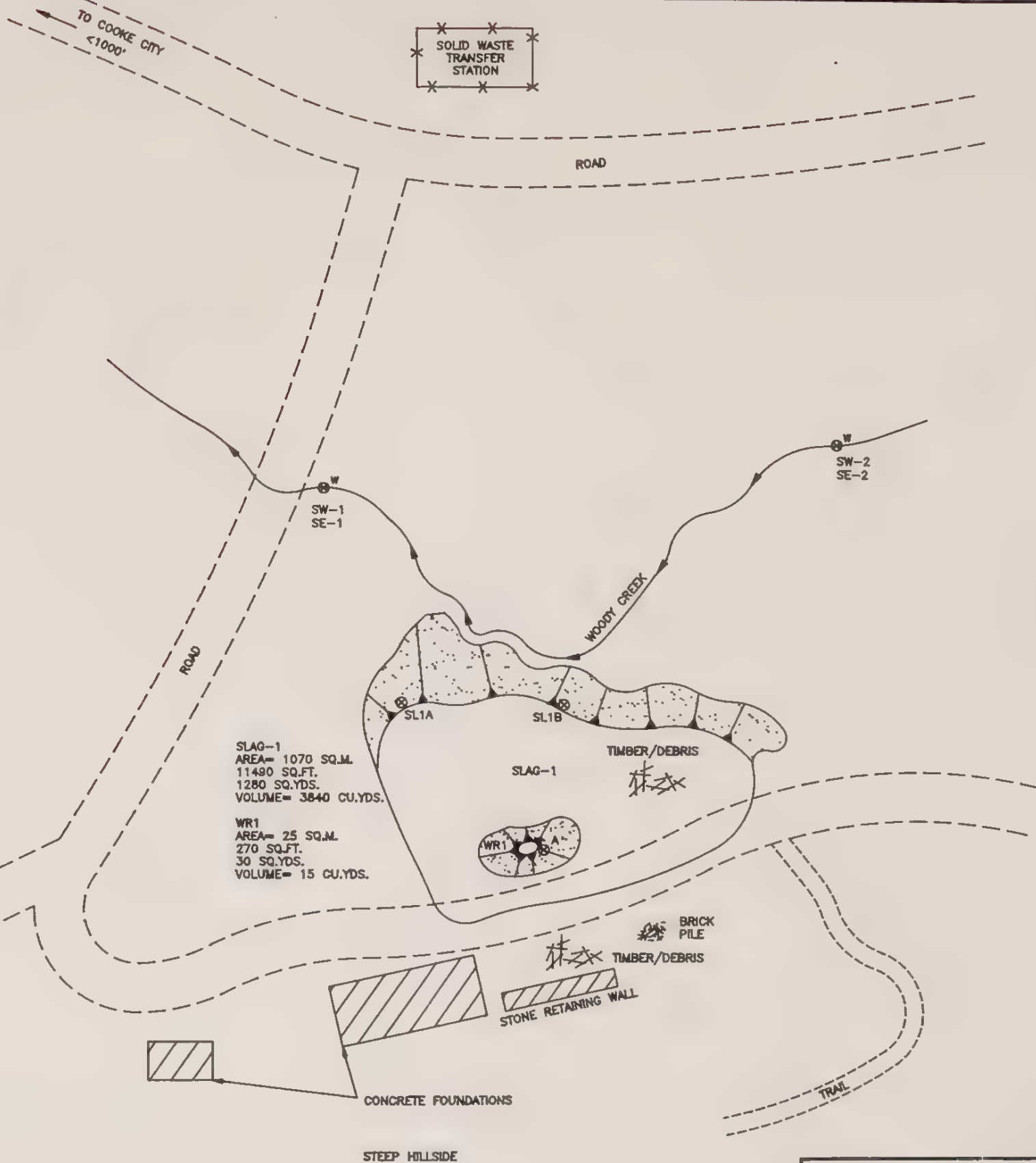
T09S, R14E, SECTION 36

SCALE: 1" = 1000'



LEGEND

- | | | | |
|--|------------------------------------|--|---------------------------------|
| | XRF SAMPLE | | IMPROVED ROAD |
| | WATER SAMPLE
GROUND AND SURFACE | | UNIMPROVED ROAD |
| | DRAINAGE | | STRUCTURE |
| | DRY DRAINAGE | | COLLAPSED TIMBERS |
| | FENCE | | SLOPE DIRECTION |
| | BRICK PILE | | WASTE ROCK DUMP
OR SLAG PILE |



DRAWN FOR: PIONEER TECHNICAL SERVICES, INC.	TITLE: GREAT REPUBLIC PA# 34-000	
	DRAWING NO.: PT340241 DATE: 11/27/94	REV: - PLOT SCALE: 1 = 15

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification: (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures/vessels sound, are runoff/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): N/A

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): N/A

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): N/A

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): N/A

Comments on potential for mitigation: N/A

SAMPLERS: West

b-Direct reading (Kelway Meter) ; S-Saturated Paste (Orion Meter)

MDSL AMRB/PIONEER 5/16/94

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes___, No X, Number:___ Identification:___

Filled shafts: Yes___, No X, Number:___ Identification:___

Seeps/Springs: Yes___, No X, Number:___ Identification:___

Groundwater wells within 4 miles?: Yes X, No___;

Number of well logs: 126

Distance to nearest well used for drinking:

X <1,000 ft; ___ 1,000 ft to 0.5 miles; ___ >0.5 miles.

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW);
Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter),
temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?

Definite___, Probable___, Possible X, Unlikely___.

Uncontained source in floodplain; however, slag is typically insoluble.

Approximate Depth to Groundwater: X <25 ft; ___ 25 - 100 ft; ___ >100 ft.

Other observations/notes: Residence located above the site.

SAMPLERS:

[illegible]

FLOW: Estimated (E) or Measured (M) from edit, shaft, reep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes X, No , Name(s): Woody Creek

Dry streambeds: Yes , No X, Name(s):

Other surface water: Yes , No X, Name(s)/Description:

Waste materials within any floodplain: Yes X, No Source ID(s): Slag pile located in Woody Creek floodplain; evidence of stream eroding slag.

Approximate Flood frequency? X 1 yr, 10 yr, 100 yr

Estimated seasonal flow of stream(s) (cfs/gpm)? 5 cfs

High Flow: 50 cfs, Average Flow: 5 cfs

Distance between waste source(s) and nearest surface water body (ft)? 0 feet from SL-1 to Woody Creek

Surface water draining onto or through waste sources: Yes X, No , Describe: Woody Creek flows at the toe of slag pile and is actively undercutting slag.

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?) Soda Butte Creek has Yellowstone Park.

Observed erosional/sedimentation/stream turbidity problems? Yes X, No . Distance downstream (ft)? 0-500 X; 500-1,000 ; >1,000 . Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): Fine-grained slag material noticeable in streambed.

SAMPLERS: Tuesday

LOW: Estimated (E) permiss 20 (M) permiss 20 (M)

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides?	(SO ₃)
Presence of evaporative salt deposits?	(ESD)
Discolored or turbid seepage?	(SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?	
Presence of ferric hydroxide precipitates?	(FEOX)
Presence of burned or stressed vegetation?	(VEG)
pH ≤ 5.0	(pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? Top of slag pile has
approximately 1 acre.

Wetlands present: Yes____, No X, Describe:_____

Carbonate rocks/soils: Yes X, No , Describe: Limestone in the area.

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10___; 10-30___; 30-100___;
100-300___; 300-1,000 X; 1,000-3,000___; 3,000-10,000___; 10,000 or
greater___; Comments_____

Nearest residence: X <1,000 ft; 1,000 ft - 0.5 miles; >0.5 miles.

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:

observed	high	moderate	low	none
----------	------	----------	-----	------

SAMPLERS: West

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes X, No
Describe: Summer home located south of site on hillside; house is approx. 100 feet higher in elevation than site.

Population within 1 mile: 1-10 ; 10-30 ; 30-100 X; 100-300 ;
300-1,000 ; 1,000-3,000 ; 3,000-10,000 ; 10,000 or greater ;
Comments

Evidence of recreational use on site: Yes X, No , Describe: Trail through site with off-road vehicle and human tracks; litter.

Accessibility (check each that apply): X Easily accessible - no fences, gates, or warning signs; Moderately Accessible - barbed wire fences, road gated, or signs posted; Difficult Access - chain-link fence, road gated and locked, site guarded (does not include locked or manned access points located more than 0.5 miles from the actual site).

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes X, No , Comment Yellowstone
Wilderness Area - Yes X, No , Comment Absaroka/Beartooth
T&E Species Habitat - Yes X, No , Comment Grizzly Bear
Bat Habitat - Yes , No X, Comment

Primary Drainage X; Secondary Drainage ; No Information :

Riparian Habitat Quality - High X, Medium , Low

Wetlands Frontage - High , Medium X, Low

Fisheries Habitat and Species Classification - 4

Sport Fishery Classification - 5

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes , No X, Number , types and locations:

Hazardous structures: Yes , No X, Number , types and locations:

Unstable highwalls, pits, trenches, slopes: Yes , No X, Number , types and locations:

Unstable waste piles, impoundments, undercut banks: Yes X, No , Number 1, types and locations: Slag pile is undercut by stream on north end

Fire and/or Explosion hazards: Yes , No X, Explain:

Bibliography

MBMG, Well Log Database, July 14, 1994.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0,
Prepared by Montana Natural Resource Information System, December
1989.

MDSL/AMRB Files, Montana Cultural Resources Inventory Historic Mine -
Reconnaissance Forms for Great Republic Smelter and Great Republic
Mine, Prepared by GCM Services, Inc., August 20, 1990 and August
31, 1990,.

USGS, Topographic Map, Cooke City, Montana, 7 1/2 minute Quadrangle,
1986.

LABORATORY ANALYTICAL DATA

**GREAT REPUBLIC SMELTER
PA NO. 34-000**

Great Republic Smelter PA# 34-000
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - TUESDAY
INVESTIGATION DATE: 08/17/94

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	Ag (mg/Kg)	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
34-000-SE1	0.7 U	5.6 U	157	1.0	13.2	19.7	24.8	21800	0.07	374 J	34.4	7.4 U	8.7 UJ	44.2	NR
34-000-SE2	1.8	7.0 U	152	1.4	13.9	20.8	24.3	20800	0.06	371 J	39.7	9.2 U	10.8 UJ	41.8	NR
34-000-SL1	86.0	1150	187	23.9	4.4	23.9	939	81400	0.02 U	68700 J	2.9 U	38200	91.0 J	23700	NR
34-000-WR1	97.3	9220	70.0	210	15.7	17.0	1600	121000	1.17	69000 J	3.2 U	42100	95.7 J	18300	NR
BACKGROUND	NR	14.6 J	89	0.4 U	10.5 J	30.7	40	23300	0.058 J	1450 J	20.7	158 J	5.17 U	181	NR

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	TOTAL SULFUR ACID BASE % 1/1000t	NEUTRAL POTENT % 1/1000t	SULFUR ACID BASE POTENT % 1/1000t	SULFATE SULFUR % 1/1000t	PYRITIC SULFUR % 1/1000t	ORGANIC SULFUR % 1/1000t	PYRITIC SULFUR ACID BASE POTENT % 1/1000t	SULFUR ACID BASE POTENT % 1/1000t
34-000-WR1	2.32	72.5	25.1	-47	<0.01	2.17	1.82	67.8	-42.7

WATER MATRIX ANALYSES

Metals in Water
Results in ug/L

FIELD ID	Ag	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn (mg CaCO3/L)	HARDNESS CALC.
34-000-SW1	0.12 U	1.7 JX	17.1	4.0 U	8.4 U	10.0	6.2	1800	0.24	18.1	22.0 JX	2.8	51.6 U	15.6 U	58.4
34-000-SW2	0.12 U	1.7 JX	21.9	4.0 U	8.4 U	6.8 U	5.9 U	2340	0.22	33.5	14.4 UX	2.7	51.6 U	17.4	60.5

U - Not Detected, J - Estimated Quantity, X - Outlier for Accuracy or Precision, NR - Not Requested

Wet Chemistry
Results in mg/l

FIELD ID	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
34-000-SW1	8	<5	7.0	<0.05	NR
34-000-SW2	10	<5	7.0	<0.05	NR

LEGEND

SE1 - Woody Creek downstream from site, above bridge.
SE2 - Woody Creek upstream from site, approx. 150'.
SL1 - Composite of subsamples SL1A and SL1B.
WR1 - A grab sample from subsample WR1.
BACKGROUND - From the Little Dairy Mine (34-009-SS1) (1993 Data).

SW1 - Same as sample 34-000-SE1.
SW2 - Same as sample 34-000-SE2.

XRF ANALYSIS RESULTS

**GREAT REPUBLIC SMELTER
PA NO. 34-000**

Mine Name: Great Republic Smelter PA# 34-000
XRF Field Analyses
Results in PPM

XRF SAMPLE I.D.	CrHI	K	Ca	Ti	CrLO	Mn	Fe	Co	Ni	Cu	Zn	As	Sr
34-000-SL1A		6223.86	104991	723.855 *		108027	83134.9			789.345	22869.4		282.415
34-000-SL1B		10827.6	41614.3	1218.71		13396.8	44290.7			913.463	8963.67	802.018 *	266.506 *
34-000-SL1B-DUP		11031.4	42740.1	1433.81		14650.5	44527			865.895	9213.54	706.28 *	395.456
34-000-SL1-COMP		8159.71	50575	782.397		35877.7	46153.6			917.946	10388		295.342
34-000-WR1		8752.41	19448.2	931.458		52926.4	118011			1771.66	13864.3	10029.4	189.051
XRF SAMPLE I.D.	Zr	Hg	Mo	Pb	Rb	Cd	Sn	Sb	Ba	Ag	U	Th	
34-000-SL1A	52.518 *		39.4028 *	9519.82	95.5625 *	202.09 *		79.1008 *	48.0259 *			25.0554 *	
34-000-SL1B	81.5159		27.9504 *	14119.6	77.658 *				306.538			66.7492 *	
34-000-SL1B-DUP	88.7249		23.9174 *	14537.2	98.8751 *				285.57			81.8677 *	
34-000-SL1-COMP	59.1889 *		17.0027 *	12034.5	80.4225 *			62.1721 *	193.77			50.1493 *	
34-000-WR1	70.0957 *		22.353 *	24793.1	129.477 *	226.648 *			119.195 *	619.975		41.6748 *	

* = Estimated Quantity

\$ = Unvalidated Data

**ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS)
SCORESHEET**

**GREAT REPUBLIC SMELTER
PA NO. 34-000**

AIMSS SCORESHEET

SITE NAME: Great Republic Smelter
PA NUMBER: 34-000

LINE NO.		GROUNDWATER PATHWAY	
1		OBSERVED RELEASE	0
2		EXCEEDENCES	0
3A	GW - LIKELIHOOD	CONTAINMENT	20
3B	OF RELEASE	GW DEPTH	20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
6		WELLS - 1 MI. x 2.5	65.0
7	GW - TARGETS	WELLS - 1 TO 4 MI	100
8		NEAREST WELL	10
9		TARGETS SCORE	LINES 6 + 7 + 8
10		GROUNDWATER SCORE	LINES 4 x 5 x 9
		SURFACE WATER PATHWAY	
11		OBSERVED RELEASE	0
12	SW - LIKELIHOOD	EXCEEDENCES	0
13A	OF RELEASE	CONTAINMENT	20
13B		DISTANCE TO SW	20
13C		POTENTIAL TO RELEASE	LINES 13A x 13B
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
16		DRINKING WATER POP'N	0
17		IMPACTED DRAINAGE	0
18		WETLANDS	10
19	SW - TARGETS	FISHERY	1
20		RECREATION	5
21		IRRIGATION/STOCK	2
22		T & E SPECIES HABITAT	5
23		TARGETS SCORE	SUM LINES 16 THRU 22
24		SURFACE WATER SCORE	LINES 14 x 15 x 23
		AIR PATHWAY	
25		OBSERVED RELEASE	0
26A	AIR - LIKELIHOOD	CONTAINMENT	5
26B	OF RELEASE	DISTANCE TO POPULATION	20
26C		POTENTIAL TO RELEASE	LINES 26A x 26B
27		LIKELIHOOD SCORE	LINES 25 + 26C
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
29		POPULATION - 4 MILES	300
30		NEAREST RESIDENCE	10
31	AIR - TARGETS	WETLANDS	10
32		PARKS / WILDERNESS	10
33		T & E SPECIES HABITAT	5
34		TARGETS SCORE	SUM LINES 29 THRU 33
35		AIR PATHWAY SCORE	LINES 27 x 28 x 34
		DIRECT CONTACT PATHWAY	
36		OBSERVED EXPOSURE	250
37A	LIKELIHOOD OF	ACCESSIBILITY	20
37B	EXPOSURE	DISTANCE TO POPULATION	20
37C		POTENTIAL EXPOSURE	LINES 37A x 37B
38		LIKELIHOOD SCORE	LINES 36 + 37C
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)
40	DIRECT CONTACT	POPULATION - 1 MILE	30
41	TARGETS	NEAREST RESIDENCE	10
42		RECREATIONAL USE	10
43		TARGETS SCORE	SUM LINES 40 THRU 42
44		DIRECT CONTACT SCORE	LINES 38 x 39 x 43
45	TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE		97.91
	(LINES 10 + 24 + 35 + 44) / 100,000		

SITE NAME: Great Republic Smelter
 PA NUMBER: 34-000

LINE
NO.

SITE SAFETY

1	THREAT	ACCESSIBILITY		20
2		OPEN SHAFTS	100 EA.	0
3		OPEN ADITS	50 EA.	0
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	0
5		HAZ. STRUCTURES	40 EA.	0
6		EXPLOSIVES		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 THRU 7	0
9		POPULATION - 1 MILE		30
10	TARGETS	NEAREST RESIDENCE		10
11		RECREATIONAL USE		10
12		TARGETS SCORE	SUM LINES 9 THRU 11	50
13		SITE SAFETY SCORE	(LINES 1 x 8 x 12) / 1,000	0.00

SUMMARY OF HISTORICAL ANALYTICAL DATA
FROM OTHER SOURCES

TABLE 2: REPUBLIC SMELTER SITE COOKE CITY, MT -
ASSAY, FIRST FIVE ELEMENTS

	Au OPT	Ag PPM	Cu PPM	Pb PCT	Zn PCT
92-REP-1	0.0010	4.33	399	1.37	4.16
92-REP-2	0.098	11.56	9900	3.74	3.03
92-REP-3	0.0042	11.79	28	7.40	0.04
92-REP-4	0.0030	2.52	61	2.76	3.24

TOTAL DIGESTION, ICP ANALYSIS FOR 34 ELEMENTS

Mo PPM	NI PPM	Co PPM	Cd PPM	BI PPM
78	29	5	<2.0	210
609	478	149	<2.0	266
16	19	<1	5.8	14
40	31	6	172.0	221

As PPM	SB PPM	Fe PCT	Mn PPM	Te PPM
333	171	>10.00	>20000	157
>2000	504	>10.00	>20000	199
>2000	504	>10.00	>20000	199
>2000	154	>10.00	>20000	164

Ba PPM	CR PPM	V PPM	SN PPM	W PPM
108	23	48	59	<20
94	28	<2	111	<20
54	80	8	<20	<20
10	47	12	43	<20

LI PPM	GA PPM	LA PPM	Ta PPM	Ti PCT
13	256	16	51	0.05
7	190	8	153	0.03
7	<10	28	46	0.03
7	<10	28	46	0.03

TABLE 2. CONTINUED

Al PCT	Mg PCT	Ca PCT	Na PCT	K PCT
1.11	0.96	>10.00	0.22	0.26
1.10	0.41	7.74	0.66	0.44
0.40	0.02	0.05	0.03	0.13
0.14	0.24	0.53	0.14	0.07

Nb PPM	Sr PPM	Y PPM	Zr PPM	Hg PPM
22	281	<5	31	<0.010
37	131	<5	42	<0.010
<5	10	<5	16	6.869
11	3	<5	6	0.433

TABLE 3: SOLUABLE ELEMENTS (28) REPUBLIC SMELTER SITE
COOKE CITY, MT - AQUA REGIA DIGESTION, ICP ANALYSIS

	AG PPM	Cu PPM	Pb PPM	ZN PPM
92-REP-1	>50.0	465	>10000	>20000
92-REP-2	>50.0	8696	>10000	>20000
92-REP-3	>50.0	41	>10000	343
92-REP-4	>50.0	78	>10000	>20000

Mo PPM	Ni PPM	Co PPM	Cd PPM	Bi PPM
27	2	3	<1.0	52
412	322	104	<1.0	52
14	3	<1	<1.0	6
4	2	2	127.4	60

As PPM	Sb PPM	Fe PCT	Mn PPM	Te PPM
556	29	8.81	>20000	22
>2000	293	>10.00	17101	<10
>2000	242	1.25	215	<10
>2000	72	9.93	>20000	24

Ba PPM	Cr PPM	V PPM	Sn PPM	W PPM
63	11	30	<20	29
47	10	<1	<20	<20
13	70	<1	<20	<20
<2	29	7	<20	<20

La PPM	Al PCT	Mg PCT	Ca PCT	Na PCT
5	0.57	0.75	>10.00	0.03
<1	0.49	0.31	9.76	0.03
28	0.07	<0.01	0.03	<0.01
<1	0.01	0.20	0.48	<0.01

K PCT	Sr PPM	Y PPM
0.13	180	<1
0.14	92	<1
0.04	5	<1
<0.01	<1	2



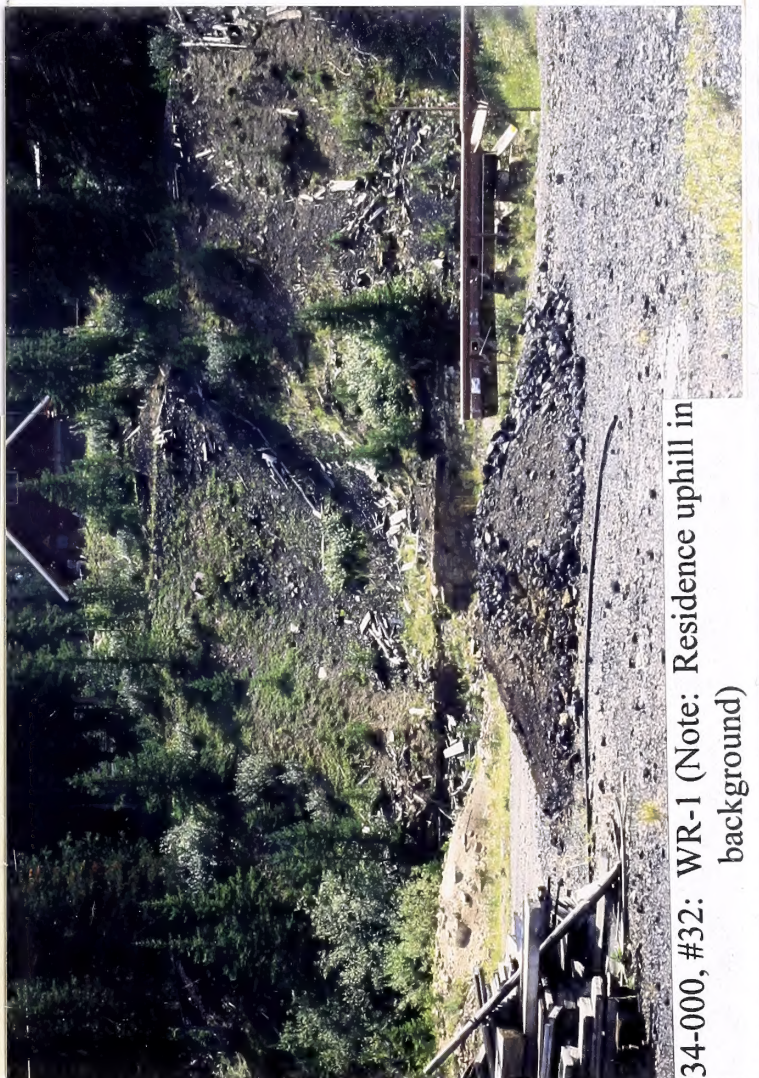
34-000, #29: SW-1 sample location



34-000, #30: East end of slag pile eroding into Woody Creek



34-000, #31: West end of slag pile eroding into Woody Creek



34-000, #32: WR-1 (Note: Residence uphill in background)



34-000, #33: North half of slag pile from west



34-000, #34: South half of slag pile from west



